NEW BOOKLET AND LEAFLETS

Rex

A folder showing several models of refrigerator cabinets suitable for apartments and small homes has been received from the Rex Manufacturing Company, Connersville, Ind. Specifications on each of these cabinets are included.

Baldor

The Baldor Electric Company, 4351-55 Duncan Ave., St. Louis, Mo., has issued a folder in which are contained a number of bulletins illustrating and giving specifications on the various types of motors manufactured by the company. These bulletins are available upon request to the company at St. Louis.

G. E.

The General Electric Company at Schenectady, N. Y., has sent in their bulletin issued under form No. GEA-528-A, giving construction details and illustrating the use of their small multistage centrifugal air compressors suitable for use in ice plants, oil burner systems, air conveyor systems and the like.

The characteristics and ratings of various size compressors are given.

Crysteel

Five pages showing a number of models of the Crysteel all porcelain refrigerator have been received from the Banjamin Electric Manufacturing Co., 120 So. Sangamon St., Chicago. Each of these pages is devoted to a particular model showing both open and closed views and giving complete specifications.

The pages are of heavy paper stock and apparently designed for a loose leaf catalogue.

REQUESTS FOR INFORMATION

The following inquiries have been received by ELECTRIC REFRIGERATION NEWS. Readers who can supply information on these subjects are invited to write at once, referring to the Query number.

Query No. 47—We should like full information, prices, etc., concerning a stock type of sylphon bellows for pressure control use.

Walter Engineering Co. President Dies

Ferdinand Carl Walter, president and manager of the Walter Engineering Co., Kenosha, Wis., manufacturers of refrigeration machinery, died recently after an illness of several months. Mr. Walter was born in Chicago, where he followed his profession for many years. He was well known in Kenosha and among engineers, being a member of the International Association of Stationary Engineers.

Finds the Perfect System

R. E. Densmore, director of districts for Kelvinator, Inc., Detroit, reports that he has located an unusually quiet operating and very nearly perfect refrigeration system for both domestic and commercial uses. In a railway folder issued by the Northern Pacific Railway he has circled a description of the town of Thompson Falls, Mont., with a population of 508, which states: "This district has a peculiar phenomena, due to crevices emitting cold air which is piped and used for storage purposes."

REX ANNOUNCES NEW DISPLAY CASE

Rex Mfg. Co., Connersville, Ind., announces the display case shown. A rear view of this same cabinet shows one large door at the top, opening into the food compartment which is designed to take an electric refrigeration cooling unit, and two doors

which open into the food compartment, permitting easy access to this section of the cabinet.

The approximate food storage capacity is 12.6 cubic feet. Over-all dimensions are, height, including skids, 65 5/16"; width, 37"; depth, 24". Dimensions of the cooling unit compartment are: Height, 12⅛"; width, 32", and depth, 18⅜". The dimensions of the food compartment are height 38", width 32" and depth 18⅜". Shelf area is 16 sq. ft. Insulation is 3" cork board in the bottom of the food compartment, with 2" corkboard around the cooling compartment and in the doors. Three pieces of plate glass of ¼" thickness, set in white felt, and separated by air-space, are in the front and sides of the cabinet. The food compartment, bottom is finished with porcelain on Armco iron. The unit compartment is finished with white enamel on galvanized iron. The outside finish is of white lacquer on alloy coated Armco iron. Hardware is of nickel plated brass, and the trimming of Monel metal.

N. E. L. A. Moves New York Office

Announcement has been made by the National Electric Light Association that after December 19 the address of the headquarters office will be 420 Lexington Ave., New York, instead of 29 West 39th St. The change is being made in order to house on one floor all of the headquarters departments and activities.

Our Error

In a broadside which was sent to a number of manufacturers on December 7th announcing the special "Catalogue and Directory Number" of January 4th, the name of the Welsbach Company was listed with the address, Gloucester, N. Y. This was an error and should have appeared as Gloucester City, N. J.

Sell the Barber Shop One

Electric refrigeration now takes its place in the modern barber shop. The Terminal Barber Shops in New York City are now using six General Electric units for cooling towels.

"PLEASE CHANGE MY ADDRESS"

Recent movements of Electric Refrigeration News subscribers as indicated by requests for changes in mailing addresses.

Adams, R. T., from 13-15 East on First South, Salt Lake City, Utah, to 139 South Arthur, Pocatello, Idaho.

Almy, L. K., from 170 Lawn Avenue, New York, N. Y., to 96 Glenbrook Road, New York, N. Y.

Bailey, A. W., from 408 Sheridan Rd., Chicago, Ill., to c/o Campbell-Ewald Co., General Motors Bldg., Detroit, Mich.

Brandel, O. A., from 973 Mission St., San Francisco, Cal., to 2308 W. 7th St., Los Angeles, Cal.

Carroll, Harry A., from 25 West 45th Street, New York, N. Y., to 225 West 34th St., New York, N. Y.

Cassidy, John D., from 5 Cortland Ave., Mamaroneck, N. Y., to 1 West 47th Street, New York City.

Diehl, D. A., changed from West Utilities Company, Morgantown, West Va., to Southern Cities Power Co., Chattanooga, Tenn.

Fowler, Elbert, from 250 West Grand Boulevard, Detroit, Mich., to 244 Mason Street, Milwaukee, Wis.

Hague, John, from 3843 Juniata St., St. Louis, Mo., to 3925 Utah St., St. Louis, Mo.

Hartwig, George C., from Jacksonville, Fla., to 4911 Winthrop Ave., Chicago, Ill.

Hillwick, F. B., from 2515 Buchanan St., N. E. Minneapolis, Minn., to 1709 Lagoon Ave., Apartment No. 5, Minneapolis, Minn.

Harris, S. W., from The Alaska Refrigerator Company, 2029 Belleview, St. Louis, Mo., to 2029 Bellevue Ave., St. Louis, Mo.

Horn, A. C., from Box 1789, New Haven, Conn., to 36 Crown Street, New Haven, Conn.

Johnson, J. B., from 66 Hazelwood Ave., Detroit, Mich., to 3778 Northwestern Ave., Detroit, Mich.

Johnson, Martin M., from Shirley Savor Hotel, Denver, Colorado, to 2600 North Western Ave., Chicago, Ill.

Kavanagh, P. J., from 1615 Monroe St., Madison, Wis., to 1801 West Grand Blvd., Detroit, Mich.

Morrison, H. L., from 9310 Dexter Blvd., Detroit, Mich., to 4818 Cortland Ave., Detroit, Mich.

Morton, Alex, from 205 State St., Albany, N. Y., to 281 11th Ave., New York City.

Nesbitt, W. L., from 253 Long Lane, Upper Darby, Pa., to 7240 Radbourne Rd., Upper Darby, Pa.

Olson, Norman, from 2836 Virginia Road, Los Angeles, Cal., to 2819 South Rimpau, Los Angeles, Cal.

Ounsworth, W. S., from 2227 Juneau Ave., Milwaukee, Wis., to 1092 Oakland Ave., Milwaukee, Wis.

Tripp, Walter E., from 1910 Chapel St., New Haven, N. Y., to 1 Febway St., Stamford, Conn.

Wimer, E. C., from 552 West Second St., Dayton, Ohio, to 1122 Edgewood Ave., Jacksonville, Fla.

Yates, C. E., from c/o Superior Iceless Refrigerator, Inc., Canton, Ohio, to 971 East 63rd St., Cleveland, Ohio.

Flashing Light Inside Cabinet Attracts Visitors

The Nashville Railway and Light Co., Nashville, Tenn., has in its display room a large size self-contained unit with glass doors fitted with an electric light installed inside the cabinet, which flashes on and off. It is reported that the attractive cabinet, with its colorful display of fruit, lighted and dark at alternate periods, is given much attention by visitors to the showroom.

New Ford and G. E. Units Shown Together

According to a news item in the Knoxville, Tenn., *News* four new models of the General Electric refrigerator were on hand at the first showing of the new Ford in that city on December 2nd.

Rodgers Leaves Bernard Gloekler

J. B. Rodgers has resigned as advertising manager in charge of sales promotion for the Bernard Gloekler Co., Pittsburgh, makers of refrigerators and store fixtures.

Home Town Pride

The J. C. Fahrney store installed a new Frigid Air refrigerator at their meat market last week. It sure is a dandy. Deep River stores are all up to the minute.—Deep River (Ia.) *Record*.

THE CONDENSER

A CLASSIFIED COLUMN OF OPPORTUNITY

REPLIES to box number advertisements should be addressed to Electric Refrigeration News, 554 Maccabees' Bldg., Detroit, Mich.

POSITIONS WANTED

National service and educational director, ten years' successful experience with some of the largest manufacturers, at present employed, desires connection with strong growing concern. Capable of organizing and taking complete charge of national or division service, preparing service or sales manuals, educational program, parts price list, etc. Favorably known throughout the trade. Box No. 58.

Chief Engineer available, connected with leading electric refrigeration concerns past eight years. Inventor and owner of patents on thermostat control and seals. Well acquainted with patent situation. Experienced designing engineer. Box No. 52.

SALES EXECUTIVE

Sales Executive desires connection. Experience consists of field, field supervision and sales promotional work with splendid record as to performance. Preference is indicated as branch manager or sales manager working in Florida or Southern territory. Box 61.

POSITIONS AVAILABLE

Combination gas electric utility, thirty thousand customers, requires services first class merchandising sales supervisor. Applicant must have had extensive and successful experience in gas and electric appliance sales field, be familiar with campaigns, advertising and supervision of sales people and sales rooms. Salary basis with commission on gross sales. Please furnish detailed experience, references, etc., first letter. P. O. Box 371, Williamsport, Pa.

"I consider your paper of inestimable value."—H. B. Monaghan, Phil H. Pierce Co., Inc., Dallas, Texas.

Subscription Order

BUSINESS NEWS PUBLISHING CO.
554 MACCABEES BLDG.
DETROIT, MICH.

Gentlemen:

Please enter my subscription to ELECTRIC REFRIGERATION NEWS, the Business Newspaper of the Electric Refrigeration Industry.

United States: ☐ $1.25 per year ☐ Two years for $2.00.
Foreign Countries: ☐ $1.50 per year.

I am enclosing payment in the form of

☐ Check ☐ P. O. Order ☐ Cash ☐ Stamps

Name _____

Street Address _____

City and State _____

Remarks: _____

☐ NOTE: If it is inconvenient for you to enclose payment with this order, check this square and invoice will be mailed. Do it now, while you have the blank before you. It will save the time and trouble of writing a letter and you will be sure to get the next issue.

ELECTRIC REFRIGERATION NEWS

The business newspaper of the electric refrigeration industry

VOL. 2, NO. 9, SERIAL NO. 33 | DETROIT, MICHIGAN, JANUARY 4, 1928 | Entered as second class matter August 1, 1927, at the Post Office, Detroit, Michigan. | PRICE TEN CENTS

1928 Catalogue and Directory Number

A Special Service

As announced in previous issues, this number of ELECTRIC REFRIGERATION NEWS has been designed to meet an immediate need of the industry—that of a comprehensive collection of data which will provide a true picture of companies and products which are ready and available to meet the market requirements of the new year. The rapid development of the industry, the changes and improvements which have been made in equipment, and the important distribution programs planned by manufacturers, all indicate the necessity for a revised estimate of the industry's potential strength.

As a special service to advertisers and to meet the numerous requests for directory information, copies of this issue are being mailed to lists of selected names in a number of interested groups. For example:

Government Agents

The Bureau of Foreign and Domestic Commerce of the U. S. Department of Commerce has furnished a list of commercial representatives of the government in all foreign countries. This issue will provide information regarding sources of supply to numerous buyers in all parts of the world.

Public Libraries

Copies are being mailed to the public libraries in all large cities of the world. These centers of information report many inquiries regarding matters pertaining to the subject of electric refrigeration.

Electrical Importers

The American Manufacturers Export Association has co-operated by furnishing a picked list of 500 concerns in foreign countries known to be interested in electrical appliances and machinery.

Refrigerating Engineers

All members of the American Society of Refrigerating Engineers, whose names appear in the following pages, will receive a copy of this issue. Many of this group are already subscribers, but others will undoubtedly appreciate this particular number.

Architects

A selected list of large architectural firms will also receive copies, on account of their influential position as local advisers to prospective buyers, particularly in the apartment house, hotel and commercial field.

Table of Contents

Index of Advertisers

Yesterday— Today and Tomorrow!

A Brief Story *of* Electric Refrigeration

By DAVID A. BROWN

It seems only yesterday—yet it may have been ten years ago—that our Chief Engineer handed me a report on the latest model Electric Refrigerator, which I read with much satisfaction (we were in the ice business in those days).

This report, like many that I had received before, told a story of an imperfect machine, one with enough "bugs" in it to keep it from being a dangerous competitor to the ice business.

For years our organization had done considerable research on the "small ice machine," as it was then called, and we were never disturbed by our findings until some few years ago when our engineers reported that several companies were making a "good machine."

Evidently the "bugs" had been removed, or enough of them so that the "small ice machine" had, practically over-night, been developed into a practical, useful and economic unit—a force to be reckoned with in the field of refrigeration.

YESTERDAY was a day of experimentation, of costly trail-blazing, of few successes, of many failures, of heart-aches, head-aches and pocket-aches.

Those of us who came into the field later have had our problems to whip, yet they were infinitesimal compared with the trials of those who pioneered the industry.

TODAY sees the industry far in advance of the "small ice machine," which really meant a household installation that was either a self-contained refrigerating unit or a remote unit.

The development has come rapidly for the line of Electric Refrigeration covers a field so vast that 90% of the total ice tonnage of this country can be supplied by Electric Refrigeration.

From the small domestic unit to the large commercial job, caring for the apartment house, restaurant, butcher, grocer, delicatessen, fish-dealer, furrier, florist, and, in fact, every user of ice with the exception of the very large installations, are the prospects open to the salesman of Electric Refrigeration.

TOMORROW offers an opportunity to those engaged in the sale of Electric Refrigeration such as has rarely been presented in a specialty business.

An almost virgin field in a business that has gripped the buying public, a public already electrically-minded, a public that will some day swoop down on the dealers and swamp them with business, is open to men of vision, men with executive ability, men with the selling instinct who have the necessary capital.

To those who measure up, we can offer a dealer or distributor franchise—in those cities where we are not represented—of a line of Electric Refrigeration that is at least the equal to that of any manufacturer in this country.

We invite your correspondence and shall be happy to furnish complete details upon your request.

{Absopure Frigerator Systems meet the requirements for homes, apartments and commercial purposes. Also Absopure Ice Cream Cabinets and Water Coolers}

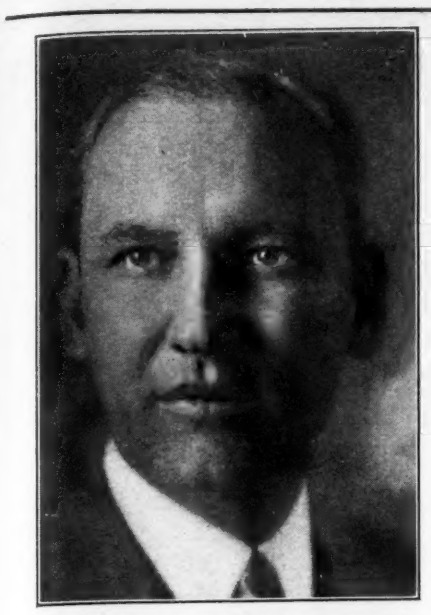
Absopure

FRIGERATOR

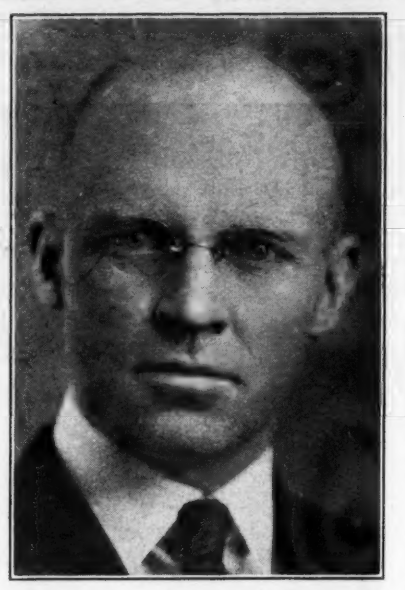
A DIVISION *of* GENERAL NECESSITIES CORPORATION

DAVID A. BROWN, *President*

General Necessities Building ››› Detroit, Michigan



G. B. Richardson
Texas Power & Light Co., Dallas, Texas
Chairman, Refrigeration Committee



Louis S. Leavitt
Electric Light & Power, Chicago
Secretary, Refrigeration Committee

Time Has Arrived for Intensive Selling Effort

Telegram to ELECTRIC REFRIGERATION NEWS

National Refrigeration Committee of the N. E. L. A. believes it is time that we get way from our former sole idea of electric refrigeration, namely that of service, as we feel that machines are reaching a point of perfection where intensive selling efforts are justifiable.

Undoubtedly our main efforts should be directed towards the promotion of sales, i. e., sales plans and ideas, that we know by past experience with other appliances, will meet with quick public interest and approval coupled with new and unique activities will result in an extensive boost to the industry in general.

We believe that with the cooperation of manufacturers, distributors and dealers of all kinds of domestic refrigerating equipment, the idea of better and year-round refrigeration can be put over in 1928.

G. B. RICHARDSON, chairman, National Refrigeration Committee, N. E. L. A.

N. E. L. A. REFRIGERATION COMMITTEE TO MEET IN CHICAGO JAN. 18

Commercial Section Committees Will Hold 3 Day Session

At the direction of J. E. Davidson of the Nebraska Power Co., Omaha, chairman of the Commercial National Section of the National Electric Light Association, notices have been issued for a series of committee meetings to be held at the Edgewater Beach Hotel, Chicago, on Wednesday, Thursday and Friday, January 18, 19 and 20. The Refrigeration Committee will hold meetings at 9:30 A. M. and 2 P. M. on Wednesday the 18th. Other sessions will be devoted to commercial cooking, competitive power, domestic electric ranges, electrical advertising, general merchandising, home lighting, lighting service, promotion rates, transportation and wiring. A general meeting and dinner, which all representatives will attend, will be held at 7 P. M., Thursday, January 19.

Meetings of other groups interested in related subjects will be held in Chicago during the week of the N. E. L. A. committee meeting for the convenience of electrical men. The Joint Committee on Fractional Horse Power Motors will hold a meeting at the Palmer House, Chicago, at 10 A. M., Tuesday, January 17. The Washing Machine Manufacturers' Association will meet Wednesday the 18th. The schedule of meetings of the N. E. L. A. committees at the Edgewater Beach Hotel is as follows:

SCHEDULE OF N. E. L. A. COMMITTEE MEETINGS

Edgewater Beach Hotel, Chicago, Ill.
January—1928

	Wednes., 18th	Thurs., 19th	Friday, 20th
Commercial Cooking	.....	.....	9:30&2:00
Competitive Power	9:30&2:00	.....	.....
Domestic Electric Range	9:30&2:00	.....	.....
Electrical Advertising	.....	.....	9:30&2:00
General Merchandising	.....	9:30&2:00	.....
Home Lighting	9:30&2:00	.....	.....
Lighting Service	.....	9:30&2:00	.....
Promotional Rates	2:00	.....	.....
Refrigeration	9:30&2:00	.....	.....
Transportation	.....	.....	9:30&2:00
Wiring	.....	9:30&2:00	.....
Luncheon Meeting, Chairmen Div. Com'l Section	12:30	.....	.....
Section's Executive	.....	4:00	.....
General Meeting and Dinner	.....	7:00	.....

EXECUTIVE COMMITTEE OF THE COMMERCIAL SECTION, N. E. L. A.

Officers

Chairman, J. E. Davidson, Nebraska Power Co., Omaha, Neb.
Vice Chairman, T. O. Kennedy, The Ohio Public Service Co., Cleveland, Ohio.
Vice Chairman, V. M. F. Tallman, Charles H. Tenney & Co., Boston, Mass.

Members-at-Large

E. W. Lloyd, Commonwealth Edison Co., Chicago, Ill.
T. F. Kennedy, Henry L. Doherty & Co., New York, N. Y.
G. E. Miller, The Cleveland Electric Illuminating Co., Cleveland, Ohio.
M. E. Skinner, Mohawk Hudson Power Corp., Albany, N. Y.
A. K. Baylor, General Electric Co., New York, N. Y.
W. L. Frost, Southern California Edison Co., Los Angeles, Cal.
S. L. Nicholson, Westinghouse Electric & Manufacturing Co., New York, N. Y.

Geographic Division Representatives

Canadian—George Atchison, Southern Canada Power Co., Montreal, Can.
Eastern—P. H. Powers, Keystone Power Corp., Ridgway, Pa.
East Central—H. W. Derry, The Union Gas & Electric Co., Cincinnati, Ohio.
Great Lakes—W. H. Sammis, Consumers Power Co., Jackson, Mich.
Middle West—W. J. Krug, Nebraska Power Co., Omaha, Neb.
New England—R. W. Mitchell, Agawam Electric Co., Springfield, Mass.
North Central—Carl J. Johnson, Otter Tail Power Co., Fergus Falls, Minn.
Northwest—J. C. Plankinton, Northwestern Electric Co., Portland, Ore.
Pacific Coast—W. C. McWhinney, Southern California Edison Co., Los Angeles, Cal.
Rocky Mountain—G. B. Buck, Public Service Co. of Colorado, Denver, Colo.
Southeastern—A. B. Collins, Alabama Power Co., Birmingham, Ala.
Southwestern—G. B. Richardson, Texas Power & Light Co., Dallas, Texas.

Committee Chairmen

Commercial Cooking—A. M. Lloyd, Commonwealth Edison Co., Chicago, Ill.
Competitive Power—H. W. Derry, The Union Gas & Electric Co., Cincinnati, Ohio.
Customer Relations—C. L. Harold, Brooklyn Edison Co., Brooklyn, N. Y.
Domestic Electric Range—A. B. Collins, Alabama Power Co., Birmingham, Ala.
Electrical Advertising—C. J. Eaton, Middle West Utilities Co., Chicago, Ill.
General Merchandising—C. E. Greenwood, The Edison Electric Illuminating Co., Boston, Mass.
Home Lighting—C. L. Dunn, The Ohio Public Service Co., Cleveland, Ohio.
Industrial Heating—W. H. Sammis, Consumers Power Co., Jackson, Mich.
Lighting Service—J. Daniels, The Edison Electric Illuminating Co., Boston, Mass.
Promotional Rates—T. F. Kennedy, Henry L. Doherty & Co., New York, N. Y.
Refrigeration—G. B. Richardson, Texas Power & Light Co., Dallas, Texas.
Street and Highway Lighting—R. J. Malcomson, Public Service Co. of Northern Illinois, Chicago, Ill.
Transportation—L. M. Branch, Commonwealth Edison Co., Chicago, Ill.
Water Heating—W. C. McWhinney, Southern California Edison Co., Los Angeles, Cal.
Wiring—M. C. Huse, The Philadelphia Electric Co., Philadelphia, Pa.

Members of N. E. L. A. Refrigeration Committee Who Will Meet In Chicago

Paul Lorch
New York Edison Co.,
New York, N. Y.

August Jaeger
Leonard Refrigerator Co.
Grand Rapids, Mich.

P. B. Zimmerman
General Electric Co.
Cleveland, Ohio

W. E. Clement
New Orleans Public Service Co.,
New Orleans, La.

C. A. Collier
Georgia Power Co.
Atlanta, Ga.

N. E. L. A. REFRIGERATION COMMITTEE

G. B. Richardson, Chairman Texas Power & Light Company, Dallas, Tex.

Ell C. Bennett, *Electric Light & Power*, 360 N. Michigan Ave., Chicago, Ill.

Frank Brigham, Welsbach Company, 629 Washington Blvd., Chicago, Ill.

R. I. Brown, Arkansas Power & Light Co., Little Rock, Ark.

H. W. Burritt, Electric Refrigeration Corp., Plymouth Road, Detroit, Mich.

H. P. Childs, Servel Corporation, 51 E. 42nd St., New York City.

F. M. Cockrell, ELECTRIC REFRIGERATION NEWS, 554 Maccabees Bldg., Detroit, Mich.

C. A. Collier, Georgia Power Co., Atlanta, Ga.

C. F. Farley, Kansas City Power & Light Co., Kansas City, Mo.

J. A. Harlan, Frigidaire Corp., Dayton, Ohio.

A. H. Jaeger, Leonard Dinsen Electric Refrigeration Corp., Detroit, Mich.

Louis S. Leavitt, Secy. *Electric Light & Power*, Chicago, Ill.

H. A. Lewis, Electric Refrigeration Corp., Plymouth Road, Detroit, Mich.

Paul Lorch, New York Edison Co., 555 E. Tremont Ave., New York City.

C. A. Stevens, Public Service Electric & Gas Co., Newark, N. J.

M. C. Terry, Westinghouse Electric & Mfg. Co., Mansfield, Ohio.

R. H. Tillman, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

E. E. Whitehorne, *Electric World*, 10th Ave. and 36th St., New York City.

H. N. Wood, Pennsylvania-Ohio Power & Light Co., Youngstown, O.

P. B. Zimmerman, Electric Refrigeration Dept., General Electric Co., Hanna Bldg., Cleveland, O.

Geographic Division Representatives

Canadian—L. W. Pratt, Dominion Power & Transmission Co., Hamilton, Ontario.

Eastern—

East Central—Ed Schmidt, Toledo Edison Co., Toledo, Ohio.

Great Lakes—

Middle West—

New England—C. E. Greenwood, The Edison Electric Illuminating Co., Boston, Mass.

North Central—H. E. Young, Northern States Power Co., Minneapolis, Minn.

Northwest—

Pacific Coast—E. F. Perkins, Pacific Gas & Elec. Co., San Francisco, Calif.

Rocky Mountain—J. M. Eakin, Public Service Co. of Colorado, Denver, Colo.

Southeastern—J. F. Derge, Florida Power & Light Co., Miami, Fla.

Southwestern—W. E. Clement, New Orleans Public Service Co., New Orleans, La.

Subcommittees

Trade Relations and Dealer Cooperation—E. E. Whitehorne, New York City.

Servicing and Installing—F. D. Pembleton, Public Service Elec. & Gas Co., Newark, N. J.

Sales Plan—G. B. Richardson, Texas Power & Light Co., Dallas, Tex.

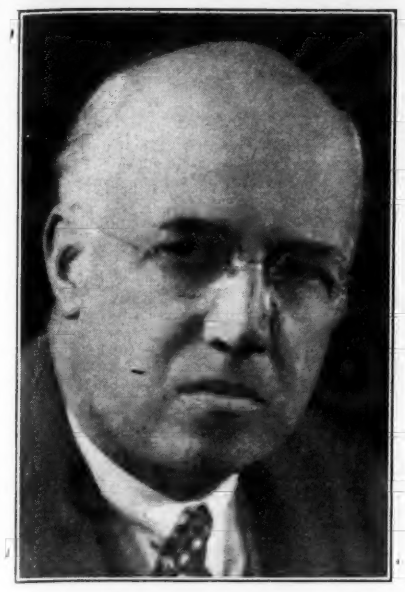
Editing—Ell C. Bennett, 360 N. Michigan Ave., Chicago, Ill.

Suggests Study of Methods Used Where Best Results Have Been Secured

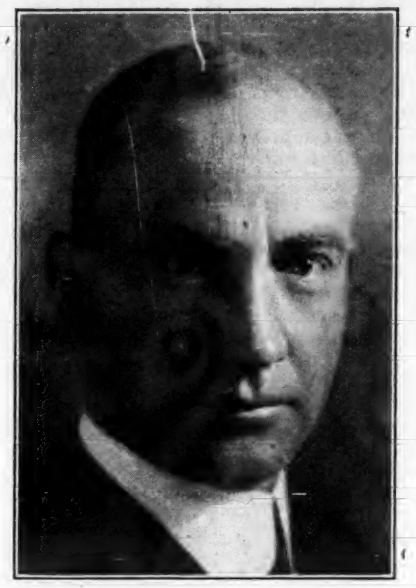
W. E. Clement, commercial manager, New Orleans Public Service, Inc., New Orleans, La., calls attention to an opportunity for the N. E. L. A. Refrigeration Committee to provide helpful information to public utility merchandising departments. He says:

"My suggestion, that as a more general 'customer acceptance' of the electric refrigeration idea is now about the most important problem confronting us, the committee might well consider concentrating its effort on a study of the methods used in cities where the larger saturation of electric refrigeration equipment has been secured. If this analysis were boiled down to essentials, made available in brief but comprehensive style, we might all gain some very helpful information."

To Discuss Methods of Developing the Market for Electric Refrigeration

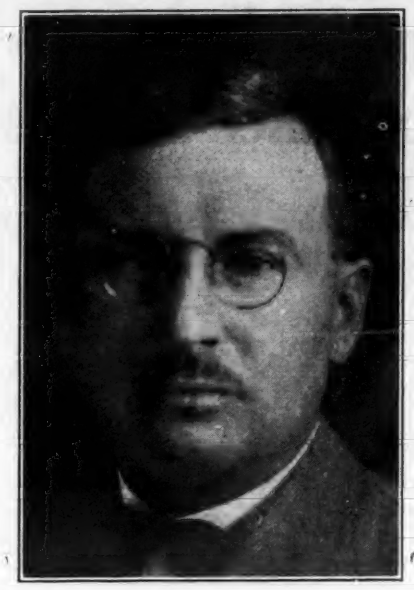


Earle Whitehorne
Electrical World
New York, N. Y.



R. H. Tillman
Consolidated Gas, Elect. Lt. & Pr. Co.,
Baltimore, Md.

C. E. Greenwood
Edison Elect. Illum. Co.,
Boston, Mass.



Howard A. Lewis
Kelvinator, Inc.
Detroit, Mich.

R. I. Brown
Arkansas Power & Light Co.
Little Rock, Ark.

1928 Should Record the Greatest Progress in the Electric Refrigeration Industry to Date

Opportunity for Refrigeration Committee to Encourage Constructive Competition

We have passed through the period of pioneering in the domestic refrigeration field, and a period of adjustment is drawing to a close.

Now comes the period of intensive selling. The coming year should record the greatest progress of the electric refrigeration industry to date.

The Refrigeration Committee has an opportcnity to further a broad selling movement among power companies and the independent trade in co-operation with the manufacturers. It can encourage the adoption of constructive competition within the electric industry, and also in connection with the ice industry.

The electric refrigeration interests and the ice interests have one great problem in common—to teach the public the need of better food preservation and the meaning of "refrigeration."

C. E. GREENWOOD.

INDUSTRY NEEDS MORE HIGH GRADE NATIONAL AND LOCAL PUBLICITY

F. D. Pembleton, assistant to vice-president in charge of sales, Public Service Electric and Gas Co., Newark, N. J., who has had much experience in electric refrigeration market development, outlines the situation and the opportunities for the N. E. L. A. Committee as follows:

"Electric refrigeration will be the most rapidly growing specialty in the electrical industry for some time to come. New fields, which refrigeration apparatus manufacturers have not yet had time to give much thought to in a practical way, will be developed.

"It has already been pointed out by some farseeing writers that refrigeration will find its way into many industries and that in some areas homes will be cooled as well as heated.

"The electrical refrigeration industry needs more publicity of both national and local character. It needs to be held on a high grade, dignified basis and not allowed to deteriorate into a price cutting war which dissipates the profits for both manufacturers and dealers.

"It is in development of these fundamentals that the Refrigeration Committee has its greatest opportunity. The Committee can have much weight in promoting cooperation between manufacturers and central station dealers; helping to stabilize the market; it can assist in promoting local advertising that can be tied in with the national advertising of manufacturers; and it can help develop methods for securing and training salesmen.

"The Committee has a great opportunity for big visions and broad gauge work."

N. Y. COMMITTEE MAKING STUDY OF HOME USE OF REFRIGERATION

Paul Lorch, a member of the National Refrigeration Committee, and also chairman of the Refrigeration Committee of the Metropolitan New York Section of the National Electric Light Association, outlines the make-up and activities of the local committee in New York as follows:

"As to the Refrigeration Committee, our particular activities have to do with the methods employed by the various public utilities in and about greatet New York in the sale of domestic and small commercial electric refrigerators. Our committee consists of the refrigeration sales managers of these several electric light and power companies and these gentlemen, of course, are very conversant with sales methods and conditions in their respective localities.

"We are also making a study of the actual application of the electric refrigerator in the home, from the viewpoint of the user. The investigations of a committee such as ours usually bring out valuable information for those interested in this particular work."

GREAT POSSIBILITIES IN SOUTHERN CLIMATES SAYS ARKANSAS MAN

R. I. Brown, assistant to vice-president, Arkansas Power & Light Co., Little Rock, Ark., is of the opinion that "The committee can assist the manufacturers materially by impressing upon them the fact that climatic conditions vary considerably in different sections of the country. It is also my opinion that considerable research work should be done in the South, where this type of refrigeration will meet with its severest test, and where also I believe an equal market will be found, in spite of the difference in population as compared with the North and East.

"I feel that the committee has done very creditable work in the past," he continued, "and has assisted member companies very materially. There is naturally a feeling that the equipment should be cheaper in price, which will permit wider distribution, but I believe it is quite obvious that production governs price, and our job is to create a larger production through intensive selling, but that the manufacturers should bend every effort to help us attain this end through promotional work.

"The past few years we have had the task of substituting electrical appliances in the household for appliances that had been in use for a century, the new householders following precedents set by their forbears. In the case of a number of appliances, our progress has been slow, but in the case of electric refrigeration we have an appliance of great value to the householder from the standpoint of health and convenience, as well as being of great value to the companies as a revenue producer, and, in my opinion, the refrigeration committee has an opportunity to assist both company and consumer by speeding up to a high point of saturation in the shortest possible time."

WORK OF COMMITTEE SHOWING RESULTS

"I believe that educational work on refrigeration will do more than any other one factor towards further development. What has already been done is showing results."—J. F. Derge, Florida Power and Light Co., Miami, Fla.

CANADIAN MEMBER SAYS REFRIGERATION HAS PROVED ITSELF

L. W. Pratt, Dominion Power & Transmission Co., Ltd., Hamilton, Canada, outlines his views of the situation in the following terms:

"As a central station, only recently engaged in extending service embracing the merchandising of electrical appliances, we are firmly imbued with the desirability of electrical refrigeration service as a very important part of our business.

(a) "In a very short time electrical refrigeration has demonstrated its complete practicability and its tremendous future potentialities.

(b) "It is a very desirable load owing to its wide diversity and continuous service demanded of it.

(c) "It will soon become as indispensable as the electric range or the vacuum cleaner, when the public realizes that the spoilage of food goes on every month in the year irrespective of weather conditions.

"Our short experience indicates to us very definitely that it pays the central station to tie up to a proven article, backed up by manufacturers with a nation-wide advertising program. The dealer can tie in with these advertisements locally at slight expense and with very great advantage.

"Best results are obtained when the dealer salesman can co-operate with the sales staff of the district office of the refrigeration company.

"When installation is made by the manufacturer, trouble calls are almost unheard of."

N. E. L. A. CONVENTION AND EXPOSITION TO BE HELD JUNE 4 TO 8

Electric refrigeration will undoubtedly occupy the central position again at the mammoth exhibition which will be staged in connection with the annual convention of the National Electric Light Association on the Million Dollar Pier at Atlantic City, New Jersey, June 4 to 8, 1928.

December 20, 1927, was the last day for filling applications for exhibit space and those who failed to make reservations by that date may be disappointed in securing space. Manufacturers of equipment desiring to be represented at this important gathering of public utility executives should immediately address L. W. Shugg, director of exhibits, National Electric Light Association, 29 West 39th St., New York City.

Following are the members of the exhibition committee:

E. W. Goldschmidt, chairman, Wagner Electric Corp., New York City, N. Y.

S. E. Doane, National Lamp Works of G-E Co., Cleveland, Ohio.

N. M. Garland, Ohio Brass Co., New York, N. Y.

George A. Hughes, Edison Electric Appliance Co., Chicago, Ill.

I. C. McQuiston, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

C. L. Pierce, Jr., Hubbard & Co., Pittsburgh, Pa.

J. J. Greene, Johns-Manville Corp., New York, N. Y.

Frank H. Gale, secy.-treas., General Electric Co., Schenectady, N. Y.

Joint Committee Agrees on Higher Standards for Electric Appliance Motors

Representatives of Motor and Appliance Manufacturers and Public Utilities Propose New Ratings

Following are the detailed minutes of the meeting of the Joint Committee on Fractional Horsepower Motors held in Cleveland, O., December 1, 1927. The next meeting is scheduled to be held at the Palmer House, Chicago, 10 A. M., Tuesday, January 17, 1928.

O. F. Stroman, Westinghouse Company, chairman of the motor manufacturers committee, presented the table of data shown in next column. He pointed out that a very large amount of redesign was required with consequent expense of upwards of a million dollars. He stated the manufacturers had omitted tolerances previously given and had raised some of the figures. He pointed out that the manufacturers were making the changed designs in good faith and hoped the other groups, and especially the central stations, would enforce the ratings and prevent attempts to bring inferior motors into service.

A. P. Good, Commonwealth Edison Company, said that he thought the central stations would use every possible effort to put all motors on the new basis of design. The larger utilities at least would see to it that power factor and efficiency values would be maintained. In Chicago every possible effort would be made to get the proposed motors on the lines.

L. W. W. Morrow, chairman, said that there was no reason to doubt that the adoption of these specifications would be followed by general enforcement by the utilities, especially if the larger utilities took steps to put enforcement rules into operation. He then said he would entertain a motion to adopt the table presented by the manufacturers.

L. L. Elden, Edison Electric Illuminating Company of Boston and N. E. L. A. representative, said he would like to introduce the element of starting current values for discussion before deciding upon the power factor and efficiency values.

C. G. M. Weber, Westinghouse Company, then presented values of locked rotor current and 75 per cent locked rotor current proposed by the motor manufacturers. He pointed out that since connected loads varied widely and instantaneous currents were difficult to measure, locked rotor values were the tangible data to fix in regard to motor current. The 75 per cent value was more or less the current reading given on a well damped ammeter when a motor started. He said these values applied to all motors proposed in the new designs except certain split phase types used on washing machines, ironing machines, some dishwashers, and certain other devices which had heavy starting and pull out torque requirements.

L. L. Elden inquired if the exceptions meant that a third class of motors would be required for the applications stated.

C. G. M. Weber replied that this would be the case if the present type and design of motors continue to be used on these devices.

L. L. Elden said this was a vital point in his opinion. If torque requirements only made it necessary to have a third line of motors for a few applications it would be very advisable to study the situation carefully, especially as the large starting currents of this type of motors caused a great deal of regulation trouble to utility lines. He said the utilities were spending large amounts to improve regulation but that there were economic limits beyond which they could not go.

A. P. Good said the committee might draw up values but that they would not be effective unless they satisfied the operating conditions on the utility systems. He said dishwashers were coming on at all hours and should not be excepted and favored no exception to the locked rotor values proposed by the motor manufacturers.

P. E. Geldhof, Syracuse Washing Machine Corporation, said that the present washing machine motor had been developed through years of trial and was free from troubles and servicing. He said the washing machine manufacturers were educating users to turn on the machine and let it run as this was cheaper.

He pointed out that a commutator type motor would cause more repairs and servicing because it had brushes and commutator and would cost a great deal more to buy. He also said that present washing machines were designed to fit the size of the motor used and that to get a good design with a longer motor would require a changed design of washing machine and very large costs. The efficiency was of minor importance yet this present motor would measure up to power factor and efficiency specifications proposed, and he felt that the starting current trouble was not very universal because washing machines were not generally used during lighting hours. He made the point that the motor now used fitted the bill from the standpoint of the user and that an enormous cost results from the use of another motor would have to be passed on to the buyer and would react on the whole merchandising and load building program of the utilities.

L. L. Elden said that values proposed by the manufacturers were very encouraging but that he was not convinced that any exceptions should be made.

L. W. W. Morrow said the washing machine manufacturers had studied their applications as requested at the Detroit meeting and said they saw no way to reduce the starting torque and pull out torque requirements through design changes.

P. E. Geldhop said the washing machine manufacturers could not stand the cost of using another motor and that the present motor used would not come within the starting current limits even if started without being connected to the washing machine mechanisms. He said to get a washing machine redesigned to look well with the larger motor would cost his company alone upwards of $100,000 to say nothing of increased costs for motors and increased list price for machines.

A. J. Francis, General Electric Company, said the whole question was a matter of economics. He said it was not economical to ask appliance manufacturers to increase costs very largely to force them to use repulsion-induction motors. Washing machines were used off lighting peaks 99 per cent of the time and starting currents are not of vital importance. If the values in the tables are accepted a great step forward will have been taken and the exceptions proposed should be made for economic reasons.

L. L. Elden said that the central stations also had economic reasons. While $5.00 increase in a motor price might look large the utilities were investing upwards of $125.00 for each customer. It is only fair that the appliance manufacturers go as far as the motor manufacturers and the utilities in sharing the economic burdens. The question should be approached from other than purely cost angles.

G. E. Miller, Cleveland Electric Illuminating Company, said people's habits were pretty well fixed and that washday on Monday and ironing day on Tuesday were fixed habits for most customers in Cleveland as indicated by load curves. He pointed out that thousands of motors going into homes involved a cost to utilities of great magnitude and that the utility expenditures to give better service were enormous. He said utility expenditures were so large that the cost of the change for washing machine improvements were minor in comparison, and said it was necessary to think of the point that the public in the final analysis paid all the costs.

P. E. Geldhof said that even a $10.00 increase in list price of washing machines at this day would be a big hardship and would put some of the manufacturers out of business. General discussion brought out differences in habits in communities in the use of washing machines. In the majority of cases it was stated that they had given little trouble, but in some apartment houses machines were said to be used on lighting hours. Central station representation pointed out the difficulties of operating a utility rule with exceptions in it.

C. C. Willard, Hobart Manufacturing Company, said meat slicers, grinders and other devices made by his company operated within the current values specified and could conform to the general rule.

L. L. Elden said that he did not believe the central stations would agree to the proposals submitted with exceptions stated. They are eager for a solution to the problem and do not deny that starting currents of washing machines cause no trouble in many instances. But they do in some cases and exceptions to a general rule would not be acceptable to many utilities.

A. P. Good said that he was willing to go along on any rules agreed upon but did not like the exceptions made.

POWER FACTOR

Horsepower	⅛	⅙	¼	⅓	½	¾
New Minimum	52	56	60	61	63	65
Present Practice of Leading Companies	42	50	54	57	62	63
	55	57	66	66	66	72
	52	52	58	63	57	69
	50	53	56	58	60	60
	52	53	54	58	60	54
		50	54	48	54	54
		60	63	64	65	65
		60	56	58	63	67
Number Under Min.	1	5	6	5	5	4

MOTOR EFFICIENCY

Horsepower	⅛	⅙	¼	⅓	½	¾
New Minimum	53	58	62	63	65	67
Present Practice of Leading Companies	57	55	61	63	65	69
	56	64	64	67	70	70
	50	52	58	63	67	71
	50	55	58	61	65	69
	44	55	60	64	63	67
		50	58	63	63	65
		50	60	63	65	65
		48	51	59	64	67
Number Under Min.	3	7	7	2	3	6

PROPOSED PRELIMINARY VALUES

Long Hour Motor					Short Hour Motor				
	App. Eff.	App. Eff.	Minimus			App. Eff.	App. Eff.	Minimus	
H.P.	Nov. 17	Proposed	Efficiency	P.F.	H.P.	Nov. 17	Proposed	Efficiency	P.F.
⅛	30	30	53	52	⅛	24	24	41	50
⅙	34	36	58	56	⅙	27	27	46	52
¼	42	42	62	60	¼	32	32	51	56
⅓	43	44	63	61	⅓	35	35	54	58
½	45	47	65	63	½	39	39	58	60
¾	48	49	67	65	¾	41	42	61	62

New Power Factor and Efficiency Values Adopted

Motion made that action on locked rotor values be deferred for the present and that the meeting accepts the values for power factor, efficiency and apparent efficiency presented by the manufacturers. These figures to apply to all fractional horsepower motors. Amended that the new motors be available at the earliest possible date with a final date of January 1, 1929, with the exception of the ¼ hp. long hour duty motor which would be accepted as of January 1, 1928, in conformity with the Detroit agreement. Motion by C. G. M. Weber, seconded by J. F. Welch, F. W. Jessop, Ohio Electric & Controller Company, said time was required to redesign and change tools to bring out the new motors and that a year was not too long, in fact, was too short for the most economical changeover for many plants.

O. F. Stroman said the manufacturers could be counted on to act as soon as possible and that a year was none too long to make such great changes.

L. L. Elden said that the utilities did not want bad motors dumped on them in the meantime and that some motors were now available which came up to the specifications.

L. W. W. Morrow said the motor manufacturers had shown a splendid spirit of co-operation and good faith after their promises at the Detroit meeting, and he felt that they would in this case.

Motion carries by vote of representatives present.

L. W. W. Morrow said the next order of business was a discussion of the locked rotor and 75 per cent locked rotor values proposed by the manufacturers. These values were proposed for all types of fractional horsepower motors with application exceptions proposed for washing machines, ironing machines and dishwashers.

A. P. Good said he could not see how the rules would be workable if exceptions were made. Why should there be discrimination for these appliance manufacturers when other appliance manufacturers assumed a heavy cost burden to conform to the rule?

A. J. Francis said the other appliances already used repulsion-induction motors and that their increased costs would be minor in comparison. He thought there would be justification for making no exception to dishwashers as these were used during lighting periods.

A. P. Good said he knew of many other appliances that used split phase motors. Why then discriminate? He suggested there be no exceptions made until specific trouble arose from this procedure.

General discussion was had as to making exceptions to the rule, allowing utilities to make individual rulings and for deferring the proposed exception for further action and study. The last thought found general acceptance, especially as many utility and washing machines representatives interested were not present and because it was felt necessary to make a more thorough study of the situation.

Moved and carried that the table of locked rotor and 75 per cent locked rotor values proposed by the motor manufacturers be accepted with the exception of these split phase motors which did not conform to the values submitted: these to be considered at a later meeting. C. G. M. Weber, O. F. Stroman, second.

L. W. W. Morrow announced that a meeting would be called very shortly wherein utility men and the appliance manufacturers concerned with the exceptions would try to arrive at a decision to place before the Joint Committee. This action was approved. These meetings were promised within the next six weeks. The chairman also announced that the Joint Committee was an informal committee representing industry groups concerned. Many groups were organized and others were not. Any action of the committee must be unanimous as regards agreement by representatives and must be reported back for approval to parent organizations in many cases. He felt, however, that an agreement was apt to be accepted and used by the industry and that the Joint Committee was effective in saving time. He suggested that as all motors were now undergoing rating specifications it might eventually be wisdom to turn over to existing agencies any further work and work to make authoritative the action of the Committee.

R. J. Russel, Century Electric Company, said it would be well to get a better appreciation of application which would use the long hour and the short hour motors. He suggested coal stokers, house pumps, shoe machines carbonetors, heat regulators, automatic compressors, general manufacturing and many other services could be specified for long hours service motors. The same procedure could be used with short hour motors.

L. L. Elden said he did not favor further specification by application as too many variables existed in service duties.

L. W. W. Morrow said the suggestion of Mr. Russel could well be considered by the group meeting between the utilities and the appliance manufacturers.

Several speakers commented on the splendid work done by the motor manufacturers in bringing forward such a constructive program.

The following attended the meeting:

P. Edward Geldhop, Syracuse Wash. Machine Corp., Syracuse, N. Y.
A. J. Francis, General Electric Co., Fort Wayne, Ind.
C. C. Willard, Hobart Mfg. Co., Troy, Ohio.
Edwin H. Cheney, Wagner Electric Corp., St. Louis, Mo.
A. R. Stevenson, Jr., General Electric Co., Schenectady, N. Y.
Wm. Bartlett, The Philadelphia Electric Co., Philadelphia, Pa.
A. F. Welch, General Electric Co., Fort Wayne, Ind.
A. H. Timmerman, Wagner Electric Corp., St. Louis, Mo.
M. W. Fish, Frigidaire Corporation, Dayton, Ohio.
E. L. Splitstone, Emerson Electric Mfg. Co., St. Louis, Mo.
H. L. Brump, Day Fan Electric Co., Dayton, Ohio.
L. H. Wheeler, Marathon Elec. Mfg. Co., Warsaw, Wisc.
L. W. Perkins, Delco Remy Corp., Anderson, Ind.
M. H. Fuller, American Slicing Machine Co., Indianapolis, Ind.
C. C. Steinhauser, General Electric Co., Indianapolis, Ind.
A. W. Segfried, Apex Electric Mfg. Co.
W. V. Orr, Apex Electric Mfg. Co.
Arthur P. Good, Commonwealth Edison Company, Chicago, Ill.
L. L. Elden, Boston Edison Company, Boston, Mass.
O. F. Stroman, Westinghouse Elect. & Mfg. Co.
C. G. M. Weber. Westinghouse Elect. & Mfg. Co., Springfield, Mass.
R. J. Russel, Century Electric Co., St. Louis, Mo.
J. L. Hamilton, Century Electric Co.
G. E. Miller, Cleveland Electric Illuminating Co., Cleveland, Ohio.
D. H. Byerly, Westinghouse Elect. & Mfg. Co., Springfield, Mass.
L. W. Nickle, *Electrical World*, Cleveland, O.
F. W. Jessop, Ohio Electric & Controller Co., Cleveland, O.
E. L. Barkhouse, Emerson Electric Mfg. Co., St. Louis, Mo.
R. E. Boyle, General Electric Co., Cleveland, Ohio.
W. H. Tucker, The Hoover Company, Canton, Ohio.
Frank H. Johnston, Day Fan Electric Co., Dayton, Ohio.
E. P. Larsh, Master Electric Co., Dayton, O.
E. B. George, The Leland Electric Co., Dayton, Ohio.
P. O. Smith, General Electric Co., Fort Wayne, Ind.
W. E. Haseltine, Holtzer-Cabot Electric Co., Boston, Mass.
W. J. Branson, Robbins & Myers Co., Springfield, O.

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Lubricating Oils
Metal Bellows
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Scale Traps
Shaft Seals

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A Positive, Compact, Non-adjustable, Permanently sealed, Gas and Water tight, Easily Applied, Low Cost Temperature Control.

Send for a Bulletin describing this rugged device that for certain applications has no equal.

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AUTOMATIC RECLOSING CIRCUIT BREAKER CO.
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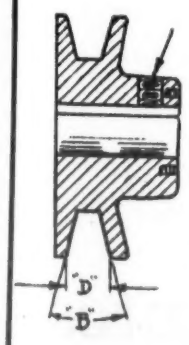
MOTOR PULLEYS AND FANS



Motor pulleys machined to fit standard shafts and "V" belts.

Motor Pulley Fans in sizes from 6 to 12 inches in diameter, either right or left hand rotation and with 5/8 or 1 inch pitch.

Attractive Prices and quick service.

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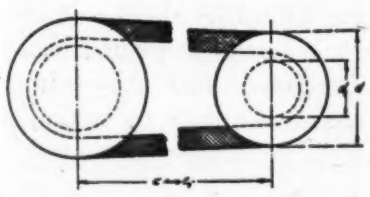

Belts may seem relatively unimportant in a machine assembly, but you can realize complete belt satisfaction if you standardize on the Gilmer "Super-Service" for all belt drives. They are always satisfactory, always dependable.

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FLOAT TYPE EVAPORATORS

We offer a complete line of Standardized float type evaporators that will fit the requirements of your Selling Organizations.

Single installations, large or small—multiple installations, ice cream cabinet and fountain evaporators and a good line for the Commercial Division.

FLOAT EVAPORATORS

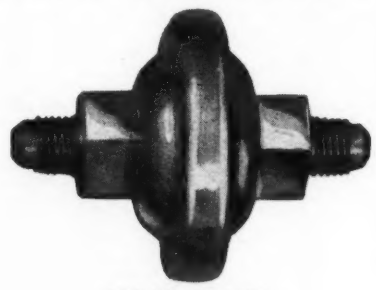
These splendid evaporators have not only been designed and produced with infinite care and accuracy, but they have been tried and tested in the crucible of field work. They are ready to become a part of your standard equipment.

LIQUID RECEIVERS

Liquid Receivers are more important than a mere drum for your refrigerant. Fedders receivers are clean inside and out, free from scale (invariably found in welded receivers) and all connections or mountings are accurately handled to suit your requirements. Large production means reasonable prices.

The resources of The FEDDERS Organization are solidly back of the determination to produce dependable devices and appliances for the Refrigerating Machine Industry.

Our Organization has worked to design an appliance correctly for the service intended, and then to make it as you, to whom we offer our earnest cooperation, would have it made.

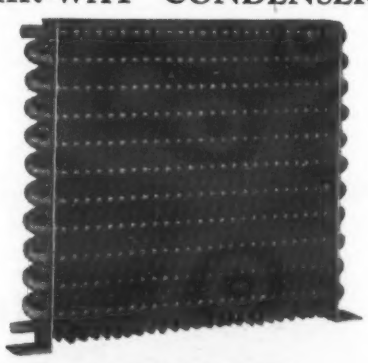


LIQUID FILTERS

It is hard to say what is the most important part of the refrigerating system,—we know that if scale, dirt and oxides are kept away from expansion and float valves that a great many service calls are eliminated. One service call will pay for many Filters.

AIR-WAY Condensers are rugged in construction and stand the rough handling in the assembly line. They are compact, efficient, spendid in appearance and truly a fine appliance that will enhance the appearance of your machine unit. Compare them in any way and we will be satisfied with your verdict.

AIR-WAY CONDENSERS



AIR-WAY CONDENSERS

BRINE TANKS

Many Engineers prefer the brine tank for its simplicity and its less frequent operating cycle, however, we offer you and your Sales organizations a choice of a splendid and complete line of brine tanks or the alternative line of Float Type Evaporators.

If sales resistance is broken down by offering a choice of units,—take advantage of this opportunity to standardize on these dependable appliances.

BRINE TANKS

Anticipate your requirements, but do not overload either yourselves or your Sales Organizations. The profit lies not in goods on the shelf but in the hands of satisfied customers. Do not sacrifice quality for price or you may regret it if you survive the experience.

EXPANSION VALVES

There is more to an expansion valve than the mere slapping of materials together. The designing of an expansion valve involves a knowledge of refrigerants and evaporators and many other little trifles that go to make up perfection. Any reducing valve should have a filter ahead of it in the liquor line,—this is of first importance. 2nd, you will like the Fedders Valve and it will give you dependable service.

Manufacturers
FEDDERS' MANUFACTURING COMPANY
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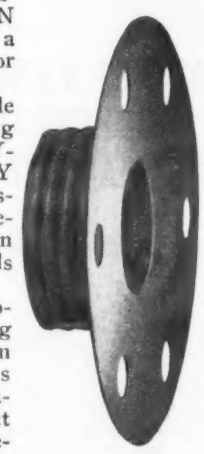

The Quality leadership of HYDRON bellows is not a matter of opinion or theory.

The remarkable process of forming the bellows HYDRAULICALLY under heavy pressure insures the detection and rejection of defective materials before shipment.

There is no rubbing or spinning action upon the thin walls. Each bellows delivered by the machines is a perfect specimen and dependable for the service for which it is recommended.

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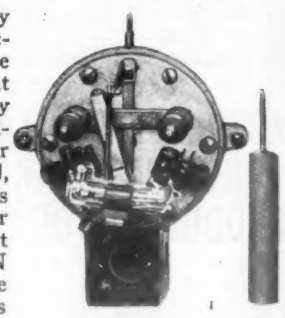

It is rapidly becoming recognized in the Trade that where accuracy and ease of adjustment either to differential, or range is necessary or desirable that the LASSEN mercury tube type control is truly a precision instrument of unusual dependability.

The modest price is not a measure of its real value as a part of your machine equipment.

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LOW TEMPERATURE LUBRICANTS

Why depend on lubricants recommended by men who know oil merely by its viscosity?

This is important, of course, but not nearly so important as a knowledge of the peculiar requirements of your own refrigerant and low pressure devices. We will cooperate closely in selecting a lubricant, "tailor-made" for your requirements.

REFINERS
SCHLIEMANN COMPANIES
NEW YORK, N. Y.

Dependable Products

Each appliance, or material, is the best that can be produced for the purpose intended and the resources and production experiences of these splendid manufacturing organizations are solidly back of our intention to offer nothing but the finest equipment and materials to the refrigerating machine industry.

SRA

Cooperation

The best thought of many Engineers has been directed towards perfecting the appliances and materials offered here. We will appreciate an opportunity to cooperate with those in the Refrigerating Machine Industry who are striving to place their Units before the Public in dependable and serviceable form.

Merchandizing Plans for 1928

Advertising and Sales Programs for Market Expansion During 1928

WILL CONCENTRATE ON INTENSIVE SALES EFFORT IN LIMITED TERRITORY

The Keokuk Refrigerating Co.'s plans for the coming year are briefly outlined by their president, G. E. Weissenburger, as follows:

"The year 1928 will inaugurate a new and more aggressive sales policy for the Keokuk Refrigerating Co. Since the company's organization in 1921 our efforts have been largely confined to the building and improvement of our original machine and the acquiring of experience in the various phases of what we believe to be a highly specialized industry. This has resulted in a small but satisfactory volume of sales over a large territory and has assured us of the reliability and advantages of our machines as well as our own strength. With this accomplished we are now ready to press the sale of our product more actively.

"In 1928 we intend to concentrate our efforts on intensive sales development in adjacent states with the belief that a better business can be built with fewer and better supported dealers than can be built with more dealers, widely scattered, receiving less help from the manufacturer than is possible with our plan of concentration."

CABINET MANUFACTURER COOPERATING WITH MACHINE PRODUCERS

During the past year we have completed 43 show rooms and have about 108 salesmen selling our goods over the United States," says F. L. Northey, president, Northey Mfg. Co., Waterloo, Iowa. "We recently have established agencies in London, England; Berlin, Germany; Havana, Cuba; Honolulu; and Tokyo, Japan.

"Our plans for 1928 are for at least a 25 percent increase or more in volume, most of which we expect to accomplish through the natural increase in our business on account of repeat orders. We have sent out word for all of our representatives to cooperate with every electric machine representative that they can get in touch with, to be cooperative and neutral to all.

"We have a definite policy not to sell ice machines but to make the best refrigerator possible to be equipped by others who do. Any references given by one ice machine company will be used only to cooperate with that particular company and will not be passed to other machine companies. It is our desire to work as fairly as possible to do with every machine sales organization or maker."

ABSOLUTE CON-TAC-TOR ORGANIZES LARGE SCALE PRODUCTION OF SWITCHES

Paul W. Peterson, vice-president, Absolute Con-Tac-Tor Corp., Elkhart, Indiana, says:

"The outstanding achievement of our corporation during the year of 1927 in the refrigeration field is the application, on a large scale, to domestic refrigerators of our surface contact switch, which is the acme of simplicity, consisting fundamentally only of a bimetallic element on which is directly mounted a mercury tube which makes or breaks the contact as the bimetal expands or contracts. The bimetal is wound on a spiral and mounted on a base plate which is directly attached to the surface of the cooling coils or a brine tank, the rest of the switch being installed in a bakelite case with a glass cover."

COOKE COMPANY WILL LIMIT 1928 OPERATIONS TO LOCAL TERRITORY

The Cooke Electric Refrigeration Co., Chicago, Ill., intends to start selling, cash or installment, only in Chicago and suburbs, then gradually spreading through Illinois. It has a feasible plan for national expansion whereby it will quickly and efficiently cover the entire United States.

"It is not our intention to make refrigerators," says Geo. J. Cooke, president. "The Cooke machine can be installed in any ice box and purchase of new refrigerator is optional with customer.

"There is no question in our minds that the industry should be completely organized to meet any common enemy and to educate the public on refrigeration, thus confining itself strictly to statement of fact in all advertising and literature."—George J. Cooke, president, Cooke Electric Refrigeration Co., Chicago, Ill.

SAVORY PLANS TO SELL DIRECT TO DEALERS

Savory, Inc., Buffalo, N. Y., have just announced that they will now sell refrigerator cabinets direct to the electric refrigeration trade. This concern is well known in the hardware and house furnishings field, as it has been identified with the manufacture of kitchen equipment for over ninety years. The name "Savory" has been nationally advertised in Women's magazines for over a quarter of a century.

Savory, Inc., is owned and operated by the Republic Metalware Co., formerly known as Sidney Shepard & Co. The company was founded in 1836, at Buffalo, N. Y., where its large factories are now located.

About twenty years ago the company entered the porcelain enameling field. They began producing refrigerator cabinets in co-operation with a well-known unit manufacturer and since that time have sold only on a contract basis, but never under their own name. Now, however, they announce a change in this policy. Though still operating as before, they will sell certain models direct to refrigeration dealers; 1928 models are described in a new catalog just issued.

BENJAMIN ELECTRIC PLANS AGGRESSIVE CAMPAIGN TO EXTEND DISTRIBUTION

The plans for market development and expansion during the year 1928 of the Benjamin Electric Mfg. Co., Chicago, Ill., include an aggressive sales campaign to extend distribution. They are offering a cabinet which is not only very attractive, from the standpoint of design, but one which will accommodate most any of the standard refrigeration units, due to the fact that they have developed adjustable interior equipment.

COPELAND PLANS LARGE ADVERTISING AND INTENSIVE SALES TRAINING

Copeland will do a large amount of national advertising in 1928, according to W. D. McElhinny, vice-president, "The campaign during the year will be carried on through more media and will reach millions of people who should be prospects for our units," he says. "We believe that advertising plays a most important part in the sale of electric refrigeration, but that in order to take advantage of advertising, distributors and dealers must be properly organized. We feel that we are in this position and that as new distributors or dealers are added we can supply them with the necessary sales help and cooperation to put them in a position to do a splendid business.

"Copeland has always laid special stress on the necessity for factory cooperation to distributors and dealers. This is decidedly a specialty business. The product must be marketed in an intensive manner. Territories must be properly covered if a satisfactory sales volume is to be obtained.

Will Hold Many Group Meetings

"We will have conventions, group meetings and frequent sales and service schools throughout the United States. At these meetings hundreds of salesmen will receive courses concerning the product and ways to sell it. Zone and district managers will contact with the entire field organization. Special help will be available at all times. carried the thought that the program should

"In planning our 1928 program we have be one of a constructive force to the industry.

"We are proud of our national sales and service organization and of the very splendid household and apartment-house business it has done this year. The Copeland organization's morale has been of the highest quality. The distributor and dealer organization's loyalty to Copeland and the spirit they have shown has had much to do with our success. Our conventions, group meetings, sales schools, sales training and other cooperation have been satisfactory and have helped mold Copeland salesmen, dealers, distributors and factory into one big organization, all working toward the same purpose—to push Copeland forward, using good business ethics toward all with whom that organization comes in contact.

"The year 1927 has been the best year in Copeland's history. Our sales for the year increased 161% over 1926, and that year showed a very great increase over 1925. We have been able this year to perfect a national sales organization consisting of 183 distributors and 1020 dealers. Along with this sales organization, we have built a service organization to insure proper installation of Copeland machines and satisfactory service to users."

WELSBACH TO EXTEND ITS CENTRAL STATION AND BRANCH OFFICE OUTLETS

Welsbach's progress during 1928 will be governed by the same conservative policies which have heretofore guided it, according to R. R. Thompson, general sales manager of the refrigeration division. "As was to be naturally expected," he says, "the reception accorded our product by the central stations was excellent and a large portion of the distribution during the coming year will be through that type of outlet.

"Welsbach attaches considerable importance to local newspaper, local billboard and direct-by-mail advertising, the appeal of our product being to the conservative buyer who looks beyond the initial period and figures the cost of maintaining the equipment as well as its operation.

"Branch office retail selling operations, of which several have been successfully established, will be multiplied and the appointment of carefully selected distributors and dealers carried on. 1927 has confirmed the belief that we can obtain the share of the business we desire and, with the intention of carrying this belief into 1928, the facilities will be augmented and provided to market an increased production of machines."

CLEVELAND COMPANY TO OFFER TWO TYPES OF WATER COOLERS

The Cleveland Iceless Cooler Company has announced early production of their improved KoldStream Water Cooler. The new product is not an experiment, having been brought to its present state after three years of continuous and intensive development. The company is not now, and never has been concerned with the production of a household refrigerator, but has confined its effort entirely to the problem of perfecting a mechanical unit for the purpose of cooling drinking water.

This machine, designed for economy in space and operating cost, is easily portable and will retail for $175. This figure makes it possible for even the smallest office now using an iced cooler to replace it on a money saving basis, and in addition get an uninterrupted supply of cold water.

KoldStream engineers have developed two types of cooler which they believe will answer all requirements. One is a portable unit for bottled water, and the other a direct connected unit for utilizing the city water system.

The company reports satisfactory progress in its plan to market its coolers through an organization of distributors and dealers.

VALERIUS WILL SELL SODA FOUNTAINS THRU ICE CREAM COMPANIES

L. A. Forsyth, general sales manager, Valerius Corporation, manufacturers of Ice-O-Matic soda fountains, Jefferson, Wisc., states that this company will continue to sell their equipment only through ice cream manufacturers who have had experience with electric refrigeration. "The ice cream manufacturer acts as our jobber," he says, "installs the equipment, and services it. Our fountains are manufactured to operate with either Nizer or Frigidaire compressors. The boiler is supplied with the fountain.

"We have met with wonderful success in merchandising our equipment through ice cream manufacturers; in fact, we have some of the largest manufacturers in the United States. An ice cream manufacturer is not interested in making a profit on the fountain he sells, but he is anxious to have all his dealers served by mechanical refrigeration. He makes his saving on delivery expense, eliminating the use of ice and salt, and for that reason will sell our equipment to his dealer at practically his cost price."

ACCESSORY MANUFACTURER WILL FURNISH SERVICE MAN TO ASSIST DEALERS

Paul W. Petersen, vice-president, Absolute Con-Tac-Tor Corp., Elkhart, Ind., says: "Our plans for next year comprise a service man to travel around the country and see that our controls are properly installed with refrigerators on both complete jobs from factory and remote installations. In addition we expect a vigorous expansion in sales and production."

UNIVERSAL COOLER IS ESTABLISHING BRANCHES IN LARGER CENTERS

The Universal Cooler Corp., Detroit, Mich., announces a merchandising policy of concentrating in the territories that have been developed during the past two years. Factory installation departments have already been opened in such centers as New York, Chicago, Philadelphia, Cleveland and Pittsburgh. The new branches will be aided by the years of experience that the company has had in its factory installation department in Detroit.

Effective sales campaigns in these territories during the months of November and December warrant a continuation of the company's effort in the populated centers.

CAMEO PLANS TO EXTEND WESTERN TERRITORY

The Cameo Refrigerator Co., Los Angeles, Calif., is extending its operations into the Inter-Mountain territory and the Southwestern States as well as the Northwest and Pacific Coast territories with a line of both wood and porcelain exterior cabinets made exclusively for use with electric refrigeration machines. They have, in the past few years, obtained practically all business through dealers in the state of California, but are now planning extensions into these adjacent states.

SURE COLD TO PUSH BOTH DOMESTIC AND EXPORT BUSINESS

E. L. Warner announces the plans of the Warner Steel Products Co., Ottawa, Kans., as follows: "After several years of conservative manufacturing and selling of electric refrigeration, we plan in 1928 to aggressively produce and merchandise our SureCold commercial and domestic equipment. Our production schedules are many times the previous years and the sales organization to dispose of this increased production is also being expanded.

"For many years we have enjoyed a large export business in our other lines, and this coming year we will seek export business on our refrigerating equipment. Several branch offices are in process of establishment."

FOREIGN SHIPMENTS OF ELECTRIC REFRIGERATORS

October Exports Reported by Bureau of Foreign and Domestic Commerce

Countries	Sets Up to 1 Ton Capacity Number	Dollars
Czechoslovakia	4	1,150
Denmark & Faroe Is.	54	8,858
France	1	189
Netherlands	3	833
Spain	14	3,075
Sweden	1	151
Switzerland	8	1,671
United Kingdom	6	1,080
Canada	27	5,433
Guatemala	13	2,281
Panama	14	3,588
Salvador	4	8,651
Mexico	20	4,328
Bermuda	5	522
Barbados	3	2,500
Jamaica	12	2,297
Other Br. West In.	2	605
Cuba	4	1,271
Dom. Republic	5	1,860
French West In.	1	200
Haitian Republic	4	840
Argentina	78	16,480
Brazil	28	4,087
Colombia	13	2,005
Ecuador	6	877
Uruguay	38	11,426
Venezuela	8	1,588
British India	3	603
British Malaya	13	2,092
Ceylon	11	980
China	1	160
Java and Madura	1	252
Hongkong	5	670
Philippine Is.	1	641
Australia	320	61,196
New Zealand	31	5,635
Brit. East Afr.	6	1,034
Brit. South Afr.	205	48,485
Brit. West Afr.	1	147
Egypt	6	1,130
Total	980	210,871

New G. E. Distributors

The General Electric Co. announces the appointment of M. S. Bulpitt Sons, Taylorville, Ill., as distributors for eighteen counties in central and southern Illinois.

Factors Affecting the Selection of Refrigerating Machine Lubricants

By F. B. Riley, Mem. A. S. R. E.

A brief discussion of the lubricating problems of the electric refrigerating machine does not permit detailed consideration of the various phases of chemical analysis. At best, it is safe to say that the final solution of this most difficult and important factor entering into small machine operation has not yet been reached.

The different refrigerants, the conditions of pressure and heat, and necessity for holding a seal (as in rotary compressors) influence tremendously the selection of lubricants. In any case certain characteristics are essential to successful and continued operation.

We know of no service which compares with small refrigerating machine in the severity of its operating requirements. Practically all other motor-driven devices, with the exception of the domestic oil burner, which has its own peculiar problems, and which are, in a way, comparable to the refrigerating machine field in their inherent difficulties, are intermittent-service devices which run at widely separated periods. In these lubrication offers no great difficulty for the reason that it is merely a matter of supplying a sufficient quantity of a lubricant to keep a bearing from "running dry." There are no attendant troubles such as mixtures with refrigerants or entraining problems in segregated parts of the unit.

For purposes of this article, we will dismiss entirely all lubricants other than the hydrocarbons, since we know of no lubricants other than distillates from crude petroleum which are satisfactory for the modern domestic refrigerating machine. Crudes vary in many ways when taken from the same field (they may also vary to a certain extent in wells in the same field) but in general the crudes are classed into those having a paraffin base and those having an asphalt base. According to some authorities the former result principally from vegetable remains occurring in strata, or beds formed during the tertiary age. The asphalt base crudes are said to be formed from remain sof animals. A further type of crude, which combines characteristics of both paraffin and asphalt, is known as mid-continent crude.

Tests of Lubricants

Of the various tests by which the characteristics of the different lubricants are determined, many have no important bearing on their availability as refrigerating machine use. The common tests are for **gravity,** or its weight as compared with water at 60 degrees F. This may have a bearing when used in the flooded, or float type of evaporators, (or boilers) when sulphur dioxide is the refrigerant. This test usually has small weight in judging the oil as a lubricant.

Within the range at which compressor lubricants perform, or should perform their service, the **flash and fire** tests have practically no interest. The paraffin oils normally have a higher flash test than the asphalt base oils but the flash and fire tests do not indicate the lubricating value.

Viscosity is usually spoken of as the "oiliness" of the lubricant but the viscosity is a measure of time rather than of lubricating value. The voscosity of oils from different crudes varies to a considerable extent through the same temperature ranges. It would not be fair, therefore, to compare the viscosity of a paraffin oil at 100 degrees with an asphalt base oil at the same temperature and then compare their voscosity at 32 degrees. However, it is eminently correct to compare viscosities of oils from the same base crude at all temperatures. Viscosity will be discussed again later on.

The **pour** test has a very important bearing on most lubricating problems. This term refers to the lowest temperature at which the oil will flow. This test will also receive further consideration.

The **corrosion** test consists of submerging a clean copper strip in the oil for a certain length of time at a temperature of, say, 212 degrees F. The strip should be clean and bright at the end of the test. Corrosion might easily become a prominent consideration in the selection of a proper lubricant if the various oil companies were not very careful in their processes of refining.

The **color** test is chiefly important as an indication of the filtering out of hydrocarbons which might be detrimental in the operation of the machine. Numbers are assigned to indicate certain shades or colors, but most of the lubricants used in refrigeration are "pale" or technically white oils. In other words, they fall below the zone where numbers have been assigned to indicate the color.

The **emulsification** test merely indicates the rapidity with which water will separate from an equal quantity of oil when thoroughly mixed. All oils for use in connection with small machines should be absolutely free from water, so we are not concerned with the ease or speed of separation.

Compounding is another useless factor so far as we are concerned, as the mixture of animal or vegetable matter does not enter into our calculations.

The **carbon residue** is interesting mainly where lubrication is required under difficult conditions of high temperature and where there might be a separation or breaking down of the lubricant. The test merely indicates the amount of carbon remaining after evaporating the required amount under certain conditions.

Requirements of Different Types of Refrigerating Systems

It is impossible to make one size of uniform fit an army and it is equally impossible to fit a single lubricant into the individual requirements of refrigerants having totally different lubricating problems. Each machine or refrigerant has its own peculiar problems.

Moisture, even to a slight extent, might be fatal to a machine using sulphur dioxide, whereas it might merely become a nuisance to a machine using ethyl, or methyl chloride, or ammonia. An oil which would be satisfactory in a reciprocating type of compressor might be useless in a rotary compressor. An oil which will handle the work perfectly when used in a dry gas system may be an unending source of trouble in a flooded type of unit with a low-side float valve, whereas with a high-side float the same oil might be satisfactory due to the greater gas velocity in a continuous tube evaporator.

The primary purpose of using a lubricant is to keep two surfaces from rubbing and causing heat with consequent loss of power and eventual stoppage of the machine. Heavy-bodied oils are useful chiefly in machines having a great unit-bearing pressure. Oils with viscosities above 350 to 400 such as these are useful only in forming a seal in rotary compressors. It is well to state here that in the high viscosity oils, the fluid friction may become an important factor in power consumption and this factor should not be overlooked in figuring overall efficiency. Speed of the rotating member may, too, be a factor for consideration. A light bodied oil at slow speeds may not form a perfect cushion or film between the surfaces, whereas a higher speed may carry the oil satisfactorily.

The mere function of lubrication, were it not so inseparably linked with refrigerant, pressure, and evaporator problems, would not offer any serious difficulties. Each refrigerant, however, seems to have its own particular army of "bugs" to worry the engineer and each type of evaporating system adds its quota of problems.

Various parts of the system have been called the heart, or the brains of the unit, but if this is so, the lubricants form the commissary department, without which the army cannot carry on.

Viscosity is, as previously mentioned. the time element in "oiliness." Technically, it is the time in seconds required by a certain volume of oil to flow through an orifice of standard size at a certain temperature. A heated oil is "thin" and a cold oil is "thick" or "heavy." The instrument in common use in the United States for determining viscosity is called a Universal Saybolt Viscosimeter. One hundred degrees is the universally accepted temperature selected for comparison of viscosities of lubricants in commercial specifications. The reading with this instrument indicates the number of seconds required for 60 cc. of oil to flow through the orifice at 100 degrees F.

An important matter for the engineer's consideration is the use of a lubricant with as low a viscosity as will permit a perfect film of oil to form between the bearing surfaces. This cuts down the fluid friction and consequent temperature in the bearings.

There is no rule which will guide an engineer unerringly in his selection of lubricants best suited to his individual needs. In many instances it is a case of "cut and try," as we frequently do not know the speed of our bearings, or pistons, the load per square inch, the temperatures under which the surfaces will act, etc. Even if all these conditions were known, there are no tables, or data, which would give an engineer a straight road to a successful solution of his problems.

With sulphur dioxide we have one problem; with direct expansion, or dry gas machines another one; and an entirely different problem with the flooded evaporators. Sulphur dioxide has a habit of dissolving out certain hydrocarbon constituents of the oils which form gummy substances, or sludges which

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Achievements of Manufacturers

Improvements in Design, New Models and Additions to Lines of Equipment

THE YEAR 1927 was one of great activity in the design and manufacture of new machines, cabinets and accessories. In answer to the demand of the previous year, voiced by central station executives and distributor-dealer organizations, for lower-priced units, greater dependability and less servicing in the field, manufacturers bent their energies to improve the detail of their equipment and to the development of small size, low-priced units. Special attention was given to the requirements of apartment-house builders and others desiring cabinets which would fit in to the small spaces available in the modern kitchen.

Great strides were made in the development of mechanical details with a view to increased efficiency and the elimination of trivial service calls. Thermostats, float valves, seals, contacts, connections, belts, bearings, and, in fact, all parts of the operating unit have been scrutinized to eliminate all possible sources of future difficulty.

An enormous amount of attention has been devoted during the past year to the study of cabinet construction and insulation. Before the advent of electric refrigeration, the quality of boxes was gradually deteriorating, due, it is claimed, to the cut-price sales of department stores and the general lack of appreciation of the advantages and economies of good construction. With the electric current bill as a definite check on the extravagance of cheap construction, there has been a marked upward tendency in the production of quality cabinets and a continued demand on the part of electric refrigerator manufacturers for cabinet design which would enable their units to make increasingly-better records in competitive tests. Research engineers and inventors have turned their attention to the possibilities for simplification in the factory production of cabinets and numerous new and novel methods have been worked out.

Colored Cabinets a New Feature

Colored cabinets represent the latest departure from previous standards and provide one of the most interesting merchandising angles of the business for the coming year. The vogue for bright colors which has swept over the country and which has been taken up and applied to one line of merchandise after another, is now bringing its note of cheeriness to the kitchen. Along with electric refrigerators in vivid reds, greens and yellows and with appealing decorations, we now have gas stoves, pots and pans and other accoutrements of the kitchen in flashing array. Recent developments in the paint and varnish field and in enameling materials and processes have made possible endless variations which will add greatly to the appeal of the electric refrigerator.

Attracted by the enormous possibilities of the electric refrigeration field, manufacturers of materials, parts and accessories have vied with one another to develop devices which would meet the favor of the large manufacturers and become standard equipment on the millions of household and commercial units to be produced in the future. The specialized experience and facilities of producers of materials and accessories entering into the finished product, have all added to the sum total of the electric refrigeration industry's progress, during the year. It is impossible to estimate how many engineers, chemists, and specialists in various phases of industrial activity have contributed their efforts to the advancement of electric refrigeration as a service to home and business.

One of the outstanding developments affecting the design of household units has been the trend towards the adoption of fin-type tubing for condensor coils. Electric refrigerator condensors have in many cases taken on an appearance of automobile radiators. The new method of construction obviously adds to the cooling effect and permits more efficient operation, while at the same time greatly conserving space in the small size units which have become so popular for apartment house use.

Much study has been given to the subject of insulation. Experiments have been carried on by independent laboratories, as well as by research departments of manufacturing companies, to determine the heat resisting qualities of various materials and methods of applying them for insulating purposes. Cork board apparently remains as the most popular standard, judging from the specifications of equipment furnished by the leading manufacturers, but the high price of this product has offered encouragement to producers of other materials. There are reports of new insulating materials consisting of unusual applications of both mineral and vegetable substances. The whole subject will evidently receive further intensive study during the coming year.

Increased Ice Cube Capacity

Chilling units, especially those used in household installations, have been going through a process of design changes, especially in the direction of increased ice-cube capacity. From the beginning, the ice cubes have proved to be one of the most popular features of the household machine, and the occasional demand of users for an extra large supply has been reflected in the efforts of manufacturers to add to the freezing capacity so that this sales appeal may be capitalized to the fullest extent. Another development in this direction has been the addition, by several manufacturers, of a self-contained unit for home or office designed primarily to produce ice cubes, rather than to provide food storage space.

Manufacturers of electric motors have been under pressure to produce motors with operating characteristics which would meet the special requirements for electric refrigeration service. Fractional-horsepower designs which had given entirely satisfactory service for other applications, have been found wanting in the electric refrigeration field. There has been an insistent demand for more quiet operation, higher efficiency and higher power factor. Motor manufacturers have responded to the call and the indications are that the coming year will see new standards adopted which will represent a big advance over previous ratings.

Definite improvement is being evidenced in the hardware, trim and other accessories of cabinets. Better designs and better quality are now much in evidence on the display floors of electric refrigerator dealers. In the commercial field, many new materials have been applied to finish ice cream cabinets, water coolers and other equipment for use in retail stores. Rubber and glass compositions are being used to match other store fixtures and to provide other qualities desired in these commercial applications.

Many new and unusual uses have been found for electric refrigeration during the past year. Equipment has been applied for a great variety of purposes in which neither food nor drink are concerned. Hospitals and laboratories are now using machines extensively to preserve bacteriological specimens. Medical colleges, it is said, are going into the market for special cabinets, for the somewhat gruesome purpose of preserving cadavers. Watch manufacturers, it is reported, are using electric refrigerators to test the operation of time pieces with special reference to the action of lubricants in cold climates. Testing laboratories find the equipment useful in their study of the action of various materials in low temperatures. The engineering departments are actively co-operating in providing special designs to meet these new requirements.

In the following columns, executives of leading manufacturers have outlined, at the request of ELECTRIC REFRIGERATION NEWS, the outstanding achievements of their companies during 1927, with specific reference to improvements in design, additions to, or changes in their line of products.

COMPLETE LINE OF SMALL MODELS ADDED BY COPELAND IN 1927

W. D. McElhinny, vice-president in charge of sales, Copeland Sales Co., Detroit, summarizes the high points of their engineering and production progress as follows:

In 1927 we presented to the public a complete line of household models consisting of four electric refrigerators in the 5-foot class, also a complete all-porcelain line in the following sizes: 7, 9, 12, 14 and 16 cubic feet of food storage capacity. These models were very favorably received due to their reasonable price for all-porcelain models, their fine construction, special features, such as a vegetable compartment, large shelf space, defrosting arrangement, the large ice capacity of each size, and their quiet and economical operation.

Accompanying this standard line was a line of models ranging from $170.00 to $300.00 f. o. b. factory, for installation in customers' present refrigerators. The ice capacity of these models was increased and certain refinements were made in the compressors, particular attention being paid to the appearance of the compressor.

We also introduced a double-cylinder compressor equipped with a ¼ h. p. motor and having capacity to refrigerate commercial refrigerators up to 100 cubic feet in size. A line of electric water coolers was placed on the market during the year.

In September, we introduced the Copeland model N-5, of which we feel extremely proud. Its price is below two hundred dollars and we consider it a wonderful value. It is a full 5-cubic-foot refrigerator. It has an ice capacity of 108 ice cubes, or 6.6 pounds. It is equipped with a double-depth ice drawer for freezing desserts. No drain is necessary. Its appearance compares most favorably with very high-priced electric refrigerators. It is quiet and economical in operation and our distributors have been particularly successful in selling it to the small home, to builders and to apartment houses. We have received hundreds of orders for this model this fall for apartment house use.

We face the year 1928 with more confidence than we have ever had as to the place Copeland will occupy in the industry. The benefits of our organization's work, of the sales training and of our general policies, are now beginning to accrue to us. We hope that our 1928 program will be one of a constructive force in the industry.

WELSBACH ENTERS FIELD OF REFRIGERATION WITH LOW PRESSURE SYSTEM

R. R. Thompson, general sales manager refrigeration, Welsbach Company, Gloucester, N. J., replies to the request for a statement of the Welsbach achievements during the past year as follows:

"As Welsbach refrigeration was brought to thenational market in the year 1927, our development of the low-pressure slow-speed system is our outstanding contribution to the industry for that year. Low pressure is more than merely a trade slogan. It signifies the accomplishment of those things held desirable yet previously unattainable.

"Using as a basis ethyl chloride, 'alcozol,' the exclusive Welsbach refrigerant, was developed. Further, the problem of lubrication of a system using a chlorinated hydro-carbon was solved by the Welsbach research laboratories. The special Welsbach lubricant is fluid at low temperatures, possesses lubricating qualities equal to the best mineral oil, does not combine with the refrigerant and is exceptionally durable.

"The Welsbach compressor is of a single piston type but double acting, delivering the compression effect of a two cylinder pump. Because of this innovation in design, because of the extreme precision with which the compressor is manufactured and because every moving part is continually immersed in flooded lubrication, insuring long life and completely sealing the piston rings against the back passage of gas, we are able to accomplish with a positive displacement pump a volumetric capacity and efficiency heretofore approached only by rotary-type compressors.

Detailed Improvements

"We found it necessary to revise and better previous standards in the matter of evaporator coil winding, thermostatic control, expansion valve, compressor seal, suspension of condensing unit on the equipment side and to construct a different type of one-piece steel cabinet without vertical or horizontal wooden frame members, severely plain and easily cleaned, insulated with corkboard and pitch seal completely throughout.

"In addition to the present five models, we now have a complete line of commercial condensing and freezing units, water and beverage coolers."

WARNER STEEL BRINGS OUT 3 COMPRESSORS, WILL MAKE CABINETS

E. L. Warner, secretary, The Warner Steel Products Co., Ottawa, Kansas, reports the following developments:

"During 1927 we put in production a line of three-cylinder air-cooled commercial compressors designed the previous year. These three-cylinder compressors are made in three sizes, ½, ¾ and 1 horsepower. The performance of these compressors has pleased us greatly, especially in apartment house multiple hook up installations. They have also been widely used in commercial work wherever compressors of greater capacity were needed.

"We also have increased our line of domestic refrigerating equipment by installing equipment for the production of metal-clad cabinets in the various sizes commonly required. We also developed a line of commercial water coolers to be used in connection with other refrigerating equipment or separately as desired.

KEOKUK IMPROVES EFFICIENCY AND ADDS SMALL MODELS TO LINE

G. E. Weissenburger, president, Keokuk Refrigerating Co., Keokuk, Iowa, informs us that basically the Keokuk machine is unchanged. High operating efficiency, uniform temperature control and the absence of belts are still the outstanding features and the same principles are found in this year's models as in the original.

"With a view to cutting service to a

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Achievements of Manufacturers—(Continued)

(*Continued from Page 11*)

minimum," he says, "improvements have been made in the expansion valve, thermostat switch and compressor seal. The cooling units have been enlarged to provide more ice cubes and freeze them more rapidly. The efficiency of the condensers has been increased and the compressor has been made quieter than ever.

Addition have been made to the line of products with the introduction of the 1/6 H. P. compressor for small jobs and the 1/3 H. P. compressor for commercial work. A full line of all metal cabinets by the Rex Mfg. Co. is now used in conjunction with the Keokuk as well as the beautiful DeLuxe model built for those who prefer a wooden exterior cabinet. The all-wood Model A-9 has been discontinued. The field of drinking water coolers has also been entered and several models of Frantz water coolers, Keokuk equipped, are now available."

HERRICK IMPROVES CONSTRUCTION AND ADDS TO LINE OF CABINETS

During the year 1927, the Herrick Refrigerator Company made changes in its commercial line and greatly improved its household line by addition of new models, according to Edward N. Northey.

The new household cabinets consist of models made with beautiful quarter sawed oak, plywood exterior cases built in self-contained-unit cabinets and cabinets for remote installation. These same cabinets can be had in white enamel, or colored enamels at slight additional cost. These cabinets may also be had in unfinished exteriors or with priming coats allowing the user to enamel his cabinet to match his kitchen. By request, supports and proper drillings are made in the cabinet for the type of electric refrigeration to be installed.

These new household cabinets come in three styles of linings—opal plate glass, white enamel and recently porcelain linings have been added giving the customer a wide selection of linings in beautiful cases with heavy and thorough installation that will greatly economize on the use of electric current.

The new Herrick commercial refrigerators are greatly improved. Much thicker walls—four and five inches in thickness add to the previous efficiency. The commercial cabinets have heavier doors—stronger, more beautiful hardware—a more beautiful finish—all of which add attractiveness and durability. Air-tite gasket is used on the doors and the doors are constructed to make a double seal against heat leakage. Each commercial model is heavily braced with iron rods.

With these notable improvements and new models making Herrick cabinets and commercial refrigerators more adaptable and highly desirable for electric refrigeration, we believe Herrick refrigerators for electric refrigeration will receive wide sale in 1928.

CLIMAX NOW READY TO SHOW A COMPLETE LINE

With the passing of the year 1927 the Climax Electrical Refrigeration Co. of Clinton, Iowa, feel that they have completed a line of refrigerating machines that will meet all the demands of the average dealer. During this past year a one-half-ton unit was added to their line so that now there is a machine for every purpose, ranging in capacities from the smallest apartment house size to four tons.

The development of the small, fractional-tonnage units has covered a period of a number of years, although several years ago laboratory tests had proven to the satisfaction of the Climax officials that their units were satisfactory in performance. They have been subjected during the years of 1926 and 1927 to exhaustive field tests. The Climax company have followed what they term a "safe and sane" policy of first proving the machine, then making the machine prove itself over several years of satisfactory field operation.

The Climax organization are not new entrants into the refrigeration field, although their smaller units have only recently been announced. They were one of the pioneers in the development of small commercial refrigerating machines, their Model B unit being the first two-ton self-contained type machine ever manufactured. Later a successful rotary machine of one-ton capacity was developed. The design and construction of the smaller rotary units have embodied all the advantages of the larger rotary machine and have in addition a number of exceptional engineering achievements relating to the compression and condensation of the refrigerant.

The Climax Electrical Refrigerating Co. are now making plans for the manufacture of their machines in larger quantities to meet the demands of the dealer organization. New territories will be opened as rapidly as increased production will permit.

SCHNEIDER COMPANY MANUFACTURING NEW MACHINE IN OMAHA

Unit Has No Crank Shaft, Connecting Rods or Wrist Pins

The formal opening of the Schneider Manufacturing Co., Omaha, Nebr., took place on January 1, 1928. A. E. Schneider is president and F. J. Schneider secretary and treasurer of the company, which will manufacture domestic electric refrigerators ranging in size from 4 cubic feet to 12 cubic feet capacity. The Schneiders have been in business in Omaha for the last 15 years as electrical engineers and contractors.

F. J. Schneider has been studying and experimenting on an electric refrigerator for over two years. The system which has been adopted has stood a test of six months in actual operation under various conditions. Machinery has been ordered and installed sufficient to turn out twenty-five self-contained units every eight hours.

Will Supply All Advertising

The company is located in a five-story building 66 x 66 feet, with office space of 15 x 30 feet and a display room 25 x 30 feet. An illustrated catalogue is now being prepared and will be ready soon. Other literature suitable for mailing pieces and envelope stuffers will also be available. The home office will furnish all advertising, including newspaper copy. This will be done in order to secure uniformity.

The new machine is a two-cylinder, or double opposed type, cast in one piece. The machine has no crankshaft, connecting rods or wrist pins. It has a direct pressure oil feed on all bearings. The piston and drive shaft group is complete before assembling in the machine. A one-fourth to one-half horse power electric motor operates the unit. Benjamin cabinets will be used.

The self-contained unit is all that the company will attempt at this time. Later the company intends to enter the ice cream cabinet field and now has a connection with two large ice cream factories of the city.

IMPROVEMENTS IN THE DESIGN OF DISPLAY CASES MADE BY NORTHEY CO.

F. L. Northey, president, Northey Mfg. Co., Waterloo, Iowa, reports important advances in the details of commercial cabinets and display cases:

"Our biggest achievement this year was the perfection of the Isetop Counter. Contrary to the belief of many machine men and other people familiar with counters, we have proven that it is possible in our type of counter with our Isetop System to use any kind of gas or brine; regulating the temperature by simply turning a valve, to carry a solid body of ice without the machine running occasionally, which is produced by a flooded system and the Isetop patent; to freeze meats solid in the platters when desired in any climate; and freezing meats to the platters as we do with our system, the single plate glass or the three glass fronts, both patterns made by us do not sweat. Many refrigerating machine companies claim that the single glass will sweat. This is not true when the system is properly arranged and where there is a heavily insulated well for the cold air, leaving the glass up in the warm air compartment.

"We have adopted the 5 ply white oak body for our portable refrigerators, glued up with aeroplane glue. A section of this was on a roof during the summer where the sun and rain could strike it and exposed to the ice and sleet during the fall and winter and it came through perfectly. We are also furnishing our modern white pyraline lining, which does not break and is a wonderful lining for a high class box."

"Have improved a special cleanout pan, which does not necessitate removing the ice or the coils for the removal of impurities and usual jelly formations in a refrigerator. This forms with coils in tanks just the same as with natural ice, although some do not realize it and it accumulates under coils and becomes a dangerous factor."

METHODS OF PRODUCING REFRIGERATOR VALVES

The Kerotest Mfg. Co. have, during 1927, distributed many thousands of forged brass single and double shut-off valves for use on mechanical units and individual and central charging cylinders or drums, according to J. S. Forbes, treasurer. Previous to 1927, their facilities were almost completely taken up by two of the largest manufacturers of mechanical refrigerators, but during the past year they have operated on a 24-hour day basis, practically doubling their capacity and extending their market and facilities to practically all of the companies engaged in the industry.

"Valve troubles," he says "often presented a very perplexing problem, especially to the smaller manufacturers who did not have sufficiently large requirements to justify the expenditures for forging dies, and had to resort, of necessity, to cast brass valves which required tinning to minimize leakage.

"Valves used in electric refrigeration units are required to function perfectly over long periods, preventing the slightest leakage and closing off pressure after having remained in the open position for long periods of time. Brass when forged becomes a homogeneous mass, completely closing the grain and incursing against leakage because of sand holes, gas holes, pipes, etc., frequently found in castings.

"The design of the Kerotest Company's valves permits of the removal of the seal cap and exposes the stem for operation through the medium of an ordinary wrench, and does not require the employment of special socket wrenches. This is a feature which greatly pleases the service men. Our valves are produced on manually operated lathes," asserts Mr. Forbes, "where a machinist is in constant attendance and closely observes the quality and finish, making sure that each part is interchangeable, the threads smooth and clean and the double headed stem perfectly machined to insure double shut-off.

"The Kerotest Mfg. Co. machine their valve bodies and parts in large quantities, requiring only the connections to be threaded or assembled into place to comply with the specifications of their orders. Flar spuds in the double shut-off types of valves are thoroughly tinned and soldered into place. They use a babbitt tinfoil fibre inserted packing, which, in addition to the seal cap, precludes any possibility of leakage or infiltration of air in a vacuum system."

BENJAMIN DEVELOPS CRYSTEEL CABINETS OF SEAMLESS CONSTRUCTION

P. A. Powers, manager, refrigerator sales, Benjamin Electric Mfg. Co., Chicago, Ill., summarizes his company's contribution to the electric refrigeration art as follows:

"The outstanding development in connection with Benjamin Crysteel refrigerator cabinets is that, for the first time in the history of the production of cabinets for household refrigeration, an all procelain enameled cabinet has been produced in a practically seamless construction. That is, corner and top mouldings, so common in the design of metal cabinets, have been eliminated. Round corners and graceful lines predominate in the Benjamin design.

In addition to the present five models, there will be added others. Early in the year there will be presented a five-foot-net cabinet, designed especially for apartment house installation. This will also be in all porcelain."

METAL BELLOWS MAKERS ADD THERMOSTATIC AND PRESSURE CONTROLS

The Leachwood Company, Janesville, Wisc., which has been manufacturing corrugated metal bellows of the one piece type for a number of years and supplying these bellows to manufacturers to be built into their product, has gradually expanded its business to include the manufacture of complete thermostatic and pressure control instruments. During the latter half of 1927 they offered to the trade a complete thermostatic and complete pressure control for electric refrigeration.

The controls are described by E. L. Leach, secretary and treasurer of the company, as of the mechanical make and break type with separate making and breaking and running contacts. "They do not depend upon the wiping action commonly used in mechanical switches to keep the running contacts clean," he points out, "and instead have two separate sets of contacts. Both sets are made and broken instantaneously, but are so arranged that a silver point is always the first contact to be made and the last to be broken, and eliminates any possible chances of running contacts ever arcing.

"The controls are provided with easy adjusting means, both for differential and range. The power to operate the switch is provided through the use of a large has extreme flexibility, and therefore is diameter corrugated metal bellows which sensitive to small changes in pressure or temperature. The use of this type of power elements provides a relatively large amount of power per degree change in temperature."

STOW COMPANY MAKING PORTABLE TOOLS FOR CABINET FINISHING

In the field of production tools it is interesting to note that the Stow Mfg. Co., Inc., Binghamton, New York, are producing portable flexible shaft tools for external and internal grinding in electric refrigerator cabinets.

Several of the electric refrigerator manufacturers are reported to have adopted this equipment which may be had motor, friction, belt or rope driven; portable, bench, floor or suspended types, and to take various shapes of grinding wheels, polishing wheels, wire brushes and similar attachments.

Achievements of Manufacturers (Continued)

HASKLITE PERFECTS PROCESS OF MAKING MONOLITHIC CORK

One of the very important developments in the Plymetl refrigerator made by the Haskelite Mfg. Corp., Chicago, Ill., is the perfecting of the process for the manufacture of monolithic cork. "This makes it possible to use granulated cork mixed with a binder which has no affinity for moisture," explains Lyman G. Hill. "When placed between the lining of the refrigerator and the exterior wall, it can be packed in tightly to form a solid mass around the interior lining, which will not settle or disintegrate, and does not have any joints.

"We have changed the exterior wall to ¼" Plymetl," he says, "which has the stiffness of 12 gauge metal, to allow more space for cork insulation. Also, this decreases somewhat the weight of the completed refrigerator.

"During the past year we have carried on many experiments with the thought in mind to get an exterior wall that would be absolutely air tight when the refrigerator was completed. This we have accomplished, as there is now only one joint up and down the back of the food compartment, one at the top, and one at the bottom; and after the food compartment of the refrigerator is assembled, these exterior joints are soldered air tight.

"Vitrolite linings in the past have been used only in the very expensive refrigerators, but we have been successful in developing a method of assembling Vitrolite so that it can be used at a cost comparable with other high-grade linings.

New Method of Applying Door Trim

"Another change of importance in the construction of the Plymetl Refrigerator is the method of putting in the door trim. This previously was made up of several wood members, nailed and screwed together, such as is used in the conventional design of cabinet. We have designed a solid poplar front which is glued right in and becomes a part of the fabricated shell. This eliminates additional work for the assembly plant, and makes a front that will do away with checks and other defects."

ICE BOX HARDWARE INSUFFICIENT FOR NEW REQUIREMENTS

"Being manufacturers of refrigerator hardware, such as locks and hinges, and specializing entirely in this class of work, we have gone through some experience during the past two years that no one in our organization ever dreamed could happen to a manufacturer in our line," says B. R. Crampton, vice-president of the Winters & Crampton Mfg. Co., Grand Rapids, Mich.

"To begin with, a lock and a hinge to the average person means two pieces of hardware that can be applied to any swinging door, and we were more or less under the same impression ourselves until electric refrigeration appeared on the scene.

"Great was the shock when we learned that the hardware we had been manufacturing for years for the old ice refrigerator was about as efficient for the electric refrigeration cabinet as an ingrowing toenail would be to a city mail carrier.

"To meet the requirements of the electric refrigeration we have scrapped thousands of dollars worth of equipment and reinvested in preparing and re-equipping our plant to bring out a product to meet the new conditions.

"It is apparent that our efforts have not been in vain, for today our order balance is the greatest in the history of our organization, and 1928 will find our plant operating with two shifts, which was our position in 1926 and greater portion of 1927; although our production for 1928 will equal the two combined previous years."

ELABORATE LINE OF CONTROL DEVICES NOW OFFERED BY PENN SWITCH

According to information from M. E. Henning, of the Penn Electric Switch Co., Des Moines, Iowa, in the past year this company, one of the pioneers in the development of automatic switches for air compressors, expanded its line to include automatic controllers for domestic and commercial refrigeration. They designed, perfected and placed on the market pressure switches for refrigeration purposes, thermostatic switches for temperature control, ammonia switches for high and low pressure, safety cut-outs and water regulators for use in connection with ammonia refrigeration plants.

In addition to these, they will shortly offer to the industry a combination safety switch and automatic control for use in conjunction with sulphur dioxide and methyl chloride. The conventional installations of today call for two switches to do this work. The purpose of this device is to automatically control refrigerating units, but should too high a pressure develop for any reason, the same switch performs another function, in shutting off the unit until the refrigerator gases again reach a normal working pressure.

The Penn Electric Switch Co. has incorporated in these controllers a patented trip link mechanism, already used in their pressure switches, and introduced a new contact structure in a snap action, using a polarized magnet blow-out."

LAMSON ADAPTING UNITS TO VENDING MACHINES AND OTHER SPECIAL USES

"The Lamson Company, Syracuse, N. Y.," states H. W. Alexander, general manager refrigeration division, "now specializes in adapting its unit for uses in automatic retailing, such as vending machines, root beer barrels, water coolers and for ice cream cabinets.

"The unit is of the same design inaugurated five years ago and successfully used since 1923. A few changes were made in 1927, such as reduction in overall dimensions and placing the four legs on a cast iron base. It is now more fully valved for convenience and speed in servicing. In all other respects the machine is the same, for the company has invested most of its time and money in working out adaptations for greater use.

"The Lamson Company intends to pursue its new plan in a broader way for it has a wider field of activity and availability of its product which should increase its success of the past year.

ABSOPURE HOUSEHOLD AND COMMERCIAL LINE IN FULL PRODUCTION

The General Necessities Corporation enters the year 1928 with an optimistic attitude towards the possibilities of the electric refrigeration industry, according to David A. Brown, president. "Its volume of business in 1927 was very satisfactory," he says, "showing a substantial increase over the previous year. Contracts now on the books for the coming year amount to approximately $5,000,000 with still much of the country to be heard from."

Referring to the development of equipment, he summarizes the situation thus:

"During the past year, the Absopure frigerator line has been developed and we are now manufacturing every size of domestic and household models, including the refrigerator cabinets, a complete line of commercial units, water coolers and ice cream cabinets.

"It is the hope of our organization," he continues, "that the industry will be fully stabilized during the coming year so that 1928 will be a happy and prosperous one for the industry."

UTILITIES ENGINEERING INSTITUTE ORGANIZES HOME STUDY COURSE

Important among the developments of the year is the organization of systematic training courses for sales and service employees of distributors and dealers. The Utilities Engineering Institute, 3120 N. Clark Street, Chicago, Ill., one of the pioneers in this field, offers a complete course in electric refrigeration for home study.

The course consists of 48 lessons. Each lesson is complete within itself, no supplementary text books being necessary. The course is written in a plain easily understandable manner and progresses in a systematic order so as to lead the student through the entire training in a gradual easy to learn way. It is written from the standpoint of the service man, production man and salesman of refrigeration units.

The student submits an examination to each lesson which is carefully studied and corrected by the institute and returned to the student with appropriate grading and criticism.

THICKER INSULATION TO BE USED BY CAMEO REFRIGERATION CORP.

N. W. Niece, secretary of the Cameo Refrigerator Corp. of Los Angeles, states that they have formerly used an insulation consisting of one and one-half inches of cork board in a twelve-wall construction but are increasing this to two inches in the smaller models and three inches in the styles giving food storage space of over twenty cubic feet. Pure sheet cork board is used exclusively in all models including the small apartment cabinets for use with multiple installations.

AMERICAN RADIATOR OPENS NEW PLANT FOR REFRIGERATOR CASTINGS

American Radiator Co., 816 So. Michigan Avenue, Chicago, Ill., reports developments in the field of electric refrigeration as follows:

"During the past year, the Industrial Division opened and operated the Illinois plant at Springfield, Ill., whose entire output consists of castings of Arco metal. This is a special cupola mix developed to meet refrigeration requirements, and has greatly improved the quality of American domestic refrigerating units. The capacity of Illinois plant permits the Industrial Division to take job foundry work, such as compressor castings, etc., requiring a high grade of non-porous metal.

"American domestic refrigerating units are made in three heights, 11", 13" and 15", which can be tiered in any combination of these heights and can be supplied as wide as conditions require. This elasticity permits their application to semi-commercial and commercial installations where they are used without trays, cabinets as the refrigerating surface is what is required.

"Ever since the introduction of these domestic units, it has been assumed they were only possible on flooded systems, but recently it has been proven that they operate absolutely satisfactorily on expansion valve installations.

"American automatic expansion valves have been tested most drastically, and in each instance have been adopted by those who have tested them. They are now used as standard equipment on several machines.

"American float valves are made in both the high and the low pressure types. They are a new product but have successfully passed many tests and are made of the same quality as the expansion valves. The low pressure type is being successfully used in connection with American domestic refrigerating units in multiple installations."

COLOR AND DECORATION SERVICE TO BE OFFERED BY BRADLEY-HURTZ CO.

The Bradley-Hurtz Company, Chicago, Ill., announces that during the coming year their facilities and service department is to be greatly enlarged to provide a broadened scope for their designing and decorative service.

The present field service will be increased so as to work more closely with the manufacturers of electric refrigeration equipment and their branch offices. Plans are being made which will enable branch houses to apply special colors and special decorations. An urgent need for this service is being felt.

Bradley-Hurtz Company are manufacturers of finishing materials for electric refrigeration. An important part of the service furnished in this connection is the origination of finishing methods. Consulting engineers are furnished for baking ovens and finishing room equipment. Service is given for finishing rooms for the application of all finishes in the field, also designs for color schemes and decorations.

"Our most outstanding achievements," they say, "have been the adapting of lacquers and enamels to the various metals used in the refrigeration industry, the minimizing of rust and the working out of simple and attractive decorations and adapting them to the finishing methods of the various factories.

UNIVERSAL COOLER REFINED PRODUCTION AND ASSEMBLY METHODS

The Universal Cooler Corp. of Detroit reports that they have made no changes in design or control of their product in 1927. The outstanding achievement was a refinement of its manufacturing methods and the mechanics of the assembly of its product.

The development of the multiple hook-up on the expansion system, with direct temperature control on each low side, has brought this company's product prominently into the field of apartment house building. This multiple hook-up on the expansion system provides a minimum amount of refrigerant in each system, with a maximum of about five pounds to each series.

Fidelity Re-Designs Small Motors

The Fidelity Electric Co., Lancaster, Pa., has re-designed their small motors in nearly all sizes to meet the demand for a smaller, compact motor and at a lower price. They have also completed a full line of ball bearing motors.

High Lights in the Process of Making an Electric Refrigerator

Machinists Held To Limits Less Than the Thickness of a Human Hair

Perhaps the two most outstanding impressions gained from an inspection of the factory of Copeland Products, Inc., at Detroit, were the closeness of the limits under which the parts of the machine are manufactured and the great quantities of materials both raw and finished that are supplied to the manufacturers of electric refrigeration by other industries. The importance of this industry to business as a whole can only be appreciated after having seen the manufacturing operations in the factory of a successful electric refrigeration company.

The visitor to the Copeland plant first sees the machining of the compressor castings which are bought in rough form as they are needed from a foundry which makes them to Copeland's specifications. These castings are milled down at the base, side and top by one machine. The cylinder wall is then ground in by a lap machine which turns out a surface with a mirror like finish. The casting is then inspected over a powerful light which reveals any scratches or lapping marks which may have appeared in the machining process.

Following this inspection an indicator gauge is placed in the bore to check for size, roundness and taper to a limitation of two-tenths of one thousandth of one inch (.0002). E. Barger, service manager for the company, stated that "although the maximum tolerance is two-tenths of one thousandth, 90% of all production is held to one-tenth of one-thousandth of one inch (.0001). The gauge used in checking these dimensions is known as an indicator and its application to a number of the castings revealed the most minute variation in taper, roundness and size.

The reamed opening for the crankcase cover and the crankshaft bearing is checked with a plug. The alignment of front and rear crankshaft bearing holes is also checked. The case is then inspected to determine the center distance between crankshaft bearing holes and the top face of the compressor flange to which the valve plate is assembled. All thread holes are tested with thread to insure against loose or imperfect threads. The bottom of the compressor is checked for smoothness and flatness to prevent oil leaks. Having successfully passed the tests outlined above, the casting is placed under a 125 lb. air pressure test submerged in water to reveal possible leaks and sand holes in the castings.

Limits Less Than Thickness of a Hair

Perhaps a more real idea of the closeness of the limits mentioned in the foregoing paragraph will be gained from the statement that the limit of two-tenths of one-thousandth of an inch (.0002) is about 1/16 the thickness of a human hair. The gauges with wiheh these limits are maintained are checked at regular intervals by the United States Bureau of Standards at Washington.

Practically all other parts used in the complete compressor assembly are held to the same degree of accuracy. Such parts as crankshafts, connecting rods, pistons, and valves receive 100% inspection. All parts passing inspection are then released to the compressor assembly and it is a most interesting point to note that these parts in practically every instance fit exactly, and it immediately becomes apparent why such close limits were originally held in the parts manufactured. Were these parts to come to the assembly line in anything but perfect condition the line would be held up and the whole production would be retarded.

The compressor assembly when completed is placed on test jack and run continuously under pressure for a period of 24 hours, after which it is passed to an inspection test booth where it is checked for efficiency and general performance as well as quiteness of operation.

This room is insulated with 4 inches of ground cork, which shuts out all outside noise and makes it possible for the inspector to readily detect the faintest sounds or noise.

Baking and Hot Air Under Pressure Removes Moisture

The compressor released as O. K. after being tested in passed to the conveyor assembly lines where it is mounted on the condenser unit base to which is added the liquid receiver and the condenser oil, this coil being made of a special type developed by Copeland and made up out of long lengths finned copper tubing. This part of the condenser unit assembly is then placed in a long oven covered with Flaxinum in which a temperature of 250° is maintained for the purpose of baking out moisture in the system.

This being but a primary drying operation, the unit is again placed in another oven and is connected with a tube and hot air is forced through the complete system. This insures of the removal of any moisture that might have remained after the previous drying operation.

The baseboard which supports these units is covered with a sheet of light aluminum which adds to the appearance of the machine and makes it more easily cleaned.

At the end of the line a complete vacuum is drawn on the machine, after which it is given the necessary charge of Freezol. It is rather interesting to the visitor to find that this white liquid when sprayed on the hand will cause it to become extremely cold.

The condenser unit is now removed from the assembly line and connected with a cooling unit in a refrigerator. It is placed in operation and run for twelve hours; this in most cases means an overnight run. The following morning an inspector goes over each machine and checks its operation as shown on the chart of the recording thermometer. This chart shows just how many starts and stops have been made during the twelve hour period and what the variations in temperature were.

Cooling Tank Assembly Gets Pressure Test

As yet nothing has been seen of the cooling unit. In another section of the factory workmen are seen soldering the tank which is to hold the solution of water and alcohol which in turn surrounds the expansion cells through which the refrigerant circulates. The copper expansion coils are each given an air pressure test of 125 lbs. under water to reveal any possible leaks. The cooking tank is also subjected to a pressure test under water which has been found to be far greater than any pressure which could possibly be subjected by the solution which the tank will eventually hold. The coil is then placed inside of the tank and the unit finally soldered.

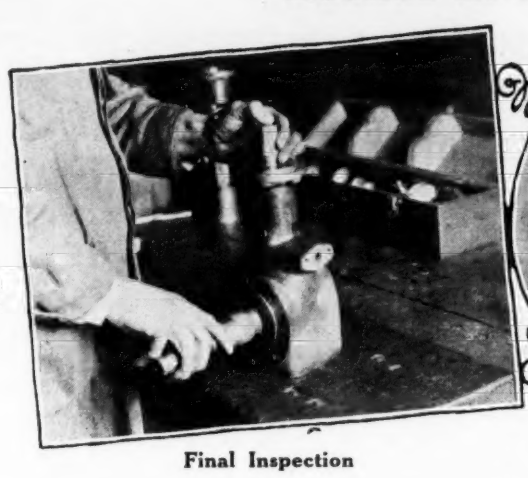
In another room the expansion valve which controls the flow of the refrigerant through the cooling unit is being assembled. Women are busy fitting together and testing the brass forgings. On the front of the cooling unit is the brain of the whole system. This little round box is responsible for the maintenance of the proper temperatures within the food compartment. A company specializing in the manufacture of control switches has perfected this little device which stands on guard day and night to see that temperatures are maintained which will reduce the action of bacteria in food to a minimum.

Stock of Units and Parts Kept Small

The manufacture and inspection of both the compressor unit and the cooling unit is now complete. The visitor is next taken to the shipping department and stockroom. The unusual thing about both of these places is that the stockroom carries only a minimum of materials and that the shipping department does not have on hand great banks of units waiting a destination. W. D. McElhinney, vice-president and director of sales for the company, explained this situation saying that it was definite policy of the company to keep banks of raw materials and stocks of finished units down to a minimum consistent with the maintenance of speedy delivery of units. As the compressors and cooling units come down on the conveyor to the shipping department they are taken from the line and placed in shipping crates which the manufacturer purchases in knock down form. No time is lost in the making of crates or the packing of the units for each type has its own shipping crate designed especially for it. The boxes are then labelled and shipped out to dealers and distributors.

While it has been impossible to appreciate all of the details which have gone into the manufacture of this product, the description which has been given will give the reader some idea of the care that is taken in the manufacture of the machine and the co-operation which is given to the manufacturer of electric refrigeration by the manufacturers of accessories used in this industry of constantly growing importance.

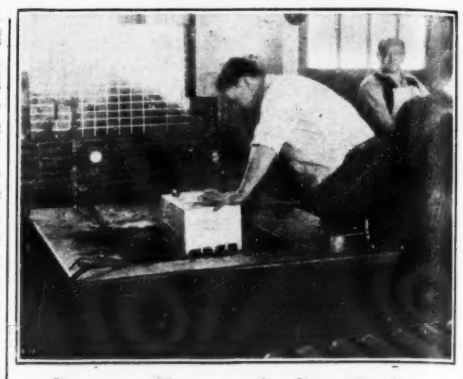
Scenes in the Copeland Plant at Detroit



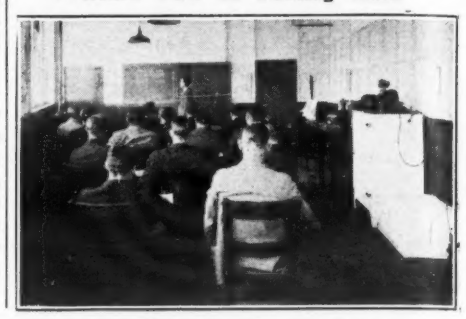
Final Inspection

Inspection and Tests of Controls

Systems Being Inspected with Lighted Tapers for Leakage

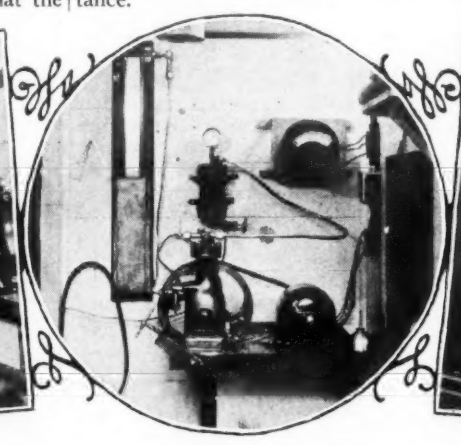


Pressure Test on Cooling Tank

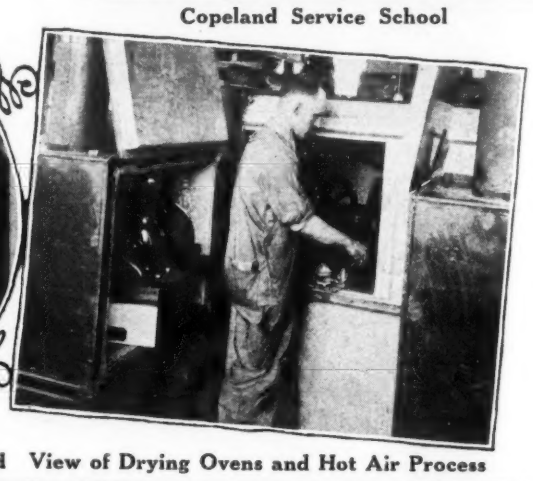


Copeland Service School

Conveyor Assembly System



"Silent Test" and test for load demand



View of Drying Ovens and Hot Air Process

General Electric Dealers at Baltimore Sales Meeting

Dealers Gatthered in front of the Hines Company Headquarters on Howard St.

Suggested Standards of Practice for Merchandising by Power Companies

(From Trade Practice in Central Station Merchandising—a serial report of the General Merchandising Committee, Commercial National Section, National Electric Light Association, October, 1927.)

1. **The primary function of the central station merchandising department is to increase earnings through load building, but it is likewise essential that profit be obtained through merchandising operation on cost principles.**

It must be recognized that the central station bears development expenses which are especially not shared by the non-electric dealer who sells primarily the electric articles having public acceptance. Pioneering is expensive, and rapidly absorbs profits from the best sellers. It is usually the promotion expenses through which all the trade benefits that make the difference between profit and loss on the central station merchandising statement, and losses, if sustained at all, should be from this cause rather than the result of unsparing selling practices.

We bring to the attention of our friends in the independent trade, that there is a normal cost for securing all business of the power companies, and the cost per kilowatt added to the lines from the merchandising branch is always low as compared to the cost of building the light and power load, which is generally recognized as an obvious and legitimate expense.

2. **Price standards should be based on marketing costs and should encourage fair competition.**

When national activity and volume selling is contemplated, and the net price to be paid by the public is to be lower than standard price because of premiums or allowances, we suggest:

A. If the selling plan originates with the manufacturer, the manufacturer makes adjustment of discount to the dealer during the period of the sale to make possible similar action by the dealer.

B. If the plan originates with the power company merchant, it is recommended that the local dealers be invited to tie in during the period of the sale, on advantageous terms.

3. **The giving of premiums as an occasional stimulus to business is a long established custom and its value is measured by results in volume and good will.**

It is of primary importance that when premiums are used the customary value of the article as designated by the manufacturer should be used in advertising. Misleading advertising is obviously not to be recognized by the central station company. We believe the best interests of the company will be served when sales with premiums are abandoned, or at least on a co-operative basis with the local trade.

4. **Deferred payments are now established practice and receive the support of leading financial men. The abuse of this practice is evident in our industry; we suggest a return to sound economic terms.**

The "dollar down and a dollar a month" practice is uneconomical, perhaps, but it had its origin in the central station effort to sell high-grade appliances at higher prices against department store and drug store products and prices.

We must bear in mind that a mass of our electric consumers have low earning power and limited budget to invest in appliances and unusual terms are sometimes justified. However, extraordinary inducement in terms should not be offered except:

A. Where no other dealers are in the local field to be affected, and

B. Where local dealers are effectively tied-in to the selling campaigns when the unusual terms are used, and the power company offers to carry the account.

We suggest twelve to fifteen months' limit for financing with exception of appliances in the stage of market development. We believe, with the exception previously noted, $15 is the minimum price for offering installments, and suggest a ninety-day limit on such payments.

Initial payments on merchandise, with few exceptions, should be a minimum of 10 per cent. Substantial initial payments should be encouraged.

In all cases, a carrying charge should be made for financing, commensurate with the cost of rendering the service.

5. **Non-electric merchandise should be sold with careful limitations.**

The practice of selling other than electric lines should be adopted only after effort is made to broaden the electric lines carried, and only closely kindred lines should be included, if any.

6. **Whatever is in the public interest in our central station merchandising practice should prevail.**

We suggest that the electric and non-electric trade get together locally for common understanding and active co-operation for merchandising in the public interest. Where leagues are established, the non-electric trade can be invited to join, or direct contact be made with other merchants selling electric devices. **We have solicited our customers to join with us in ownership of the company. Why not solicit our commercial customers to aid us in the marketing of electric service?**

FACTORS AFFECTING THE SELECTION OF MACHINE LUBRICANTS

(*Continued from Page 10*)

sometimes cause serious trouble in the machine. Many difficulties have been laid at the door of "moisture" in the sulphur dioxide which should be laid to this characteristic of dissolving out these substances from the oil. The darker oils appear to absorb into the sulphur quite readily and especially so at pressures around 75 pounds, whereas with the lighter color oils the sulphur does not absorb so readily. This latter fact has caused considerable trouble in multiple installations where the oil floats readily on the surface of the sulphur and gathers in the evaporators in the upper apartments, with consequent loss or lack of refrigeration and causing, sooner or later, a dry crank case.

Another characteristic frequently neglected is the pour test, or the temperature at which the oil will cease to flow. This is important, more especially in low temperature work. It is apparent that a low viscosity oil, with a correspondingly low pour test, should float more readily on the surface of the sulphur in a flooded system, because it does not absorb so readily into the sulphur. By the same token it will flow back more readily to the compressor because it is fluid at all temperatures within the range of the small machine.

It was formerly thought that pertoleum oils could not be used successfully in ethyl and methyl chloride machines because these oils are apparently miscible in all proportions. However, actual practice has clearly demonstrated that these oils can be successfully used, not only with ethyl and methyl chloride, but also in machines using hydrocarbon refrigerants. Viscosities are necessarily lowered, but with this factor taken into consideration, it is found that the boiling points of the refrigerants are not raised to anything like a corresponding degree. A mixture of fifty percent of oil with methyl chloride raises the boiling point only five or six degrees, which is not a serious matter to contemplate.

There is no apparent difficulty with the dry gas machine using ethyl or methyl but care must be exercised in selecting the lubricant if used in a flooded system, especially with a low-side float valve. The lubricants have a tendency to gather in the lower ends of the evaporator tubes and remain there. Some engineers who have made a study of lubricating problems in this type of unit assert that a light bodied oil, mixed in proportions of about 25 percent of oil to 75 of refrigerant, boils rapidly enough in the evaporator to cause the oil to return to the compressor in the form of bubbles of gas entrained in a film of oil. This suggestion is well worth serious study by those using methyl chloride as a refrigerant with float type evaporators, because the return of the oil is essentail to successful operation of the compressor. In addition to this, an oil filled evaporator ofchine, keeping in mind the peculiar requirements of each individual refrigerant, evaporator and compressor.

fers slight surface for the refrigerant to work on.

In addition to the troubles incident to the refrigerant or type of evaporator, the rotary compressors usually have their own particular problems of maintaining a seal between the rotor and the housing and usually a heavier bodied oil is required than would otherwise be necessary.

One of the great problems of the engineer is to devise means, either mechanical or otherwise, to keep the lubricant from passing over to the low pressure side. If this can be successfully accomplished, one of the real problems of small machine refrigeration will have passed into history. As a general conclusion, but not necessarily a rigid rule, as low a viscosity oil as will provide proper lubrication, and a correspondingly low pour test will furnish the basis of a satisfactory lubricant for the small ma-

Orlando, Fla., Frigidaire Outlet Changes Hands

Fred G. Tegder, Orlando, Fla., business man, has purchased the Todd Hyatt Company, local Frigidaire outlet. The new company will be known as Fred G. Tegder, Inc., and the business will be continued in the same location, 130 North Orange Ave. Mr. Tegder was at one time engaged in the automotive accessory business in Atlanta, Ga., where he served as head of the Atlanta Automobile Association.

ELECTRIC REFRIGERATION NEWS

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JANUARY 4, 1928

The Future Looks Good

Electric refrigeration, as we know it today, has been in the process of development for twenty years or more. The last three years, however, have represented the active and dramatic period in electric refrigeration industry. The passing of three stages of development of a new industry have been witnessed during this time.

Nineteen twenty-five was a year of promotion. New companies were organized, extensive financial operations were undertaken and great plans were made for manufacturing and selling operations. It was a year of feverish exploitation, a mad scramble to get the lead in a race for initial supremacy.

Nineteen twenty-six, it is now realized, was a year of over-expansion. There was a mushroom growth of manufacturing and distributing organizations. Hundreds of men, capable enough in other fields, took up electric refrigeration without sufficient background or knowledge of its requirements. Naturally there was confusion in the ranks and a conflict of opinion among the best of executives as to what constituted proper procedure. Soon after the middle of the year, when the promised production and sales schedules failed to materialize, a reaction set in.

Nineteen twenty-seven has been a year of reorganizations and readjustments. Burdensome overhead has been reduced, unwieldy organizations have been trimmed of surplus personnel, production costs have been cut, inventories reduced, promotion programs have been curtailed. In general, the industry, facing its problems valiantly, has striven to set its house in order, endeavoring to keep the business going while it cleared up a multitude of minor difficulties which stood in the way of sound progress.

Outlook for 1928

Nineteen twenty-eight looks good. Not all of the problems have been solved, it is true, but those who now have the business in hand, are fully informed as to the nature of their task. No longer do we hear loose talk and exaggerated promises of performance. Every one now realizes that it is necessary to deliver the goods and give value received to secure the attention and confidence of the dealer body—as well as the public.

Today, there is a definite realization of the necessity for thorough training and proper knowledge of equipment, installation and service. *With* such training, the problems impose no hardship. In brief, those who *know their business* need have no hesitancy in proceeding confidently and aggressively to develop the market for this exceedingly worthwhile product.

Leading manufacturers, experienced distributors and dealers, and prominent public utility executives, all seem to be unanimous in their opinion that the 1928 prospects are for a year of sane, healthy, and profitable development. No one expects or desires a revival of the boom times. The job is to sell electric refrigeration where it will stay sold.

The number of uses to which electric refrigeration may be economically applied is constantly growing. The appliance is being accepted as a necessary part of modern commercial and household equipment. Electric refrigeration has arrived as an integral part of the American standard of living. Furthermore, it is rapidly securing a foothold in all parts of the civilized world.

This number of ELECTRIC REFRIGERATION NEWS, the largest yet issued, reflects to a considerable degree the confidence which manufacturers feel in the opportunities for the coming year. The information contained in these pages will, we hope, prove to be of real value in providing a true picture of the industry at the opening of this next stage in the industry's forward progress.

St. Petersburg, Fla., G. E. Sales Force

BEST SALES FORCE IS COMPOSED OF DIFFERENT TYPES

Commercial and Domestic Sales Should Not Be Handled by Same Men

By Frank W. Gray
Gray Brothers Company, Denver, Colo.

The dealer in electric refrigeration must have a peculiarly organized sales force. Different circumstances require different qualities that are not always found in one salesman. Hence it is advantageous to have a versatile sales force composed of men of varied abilities. I may better explain my point by analyzing the various fields that offer sales possibilities to the dealer.

First, we have home installations; second, commercial installations; and third, business installations.

When working on household business you talk largely with housewives. Your sales talk is along the line of creating a desire to possess an electric refrigerator. You paint word pictures of the convenience of such equipment and the service it renders. It isn't necessary to discuss economies, prices, etc., for the price proposition will take care of itself if the desire to possess is aroused and the customer is sold on the idea of convenience.

Keep In Touch With Your Users

The salesman assigned to household prospects must work fast. He must accumulate a large list of prospects and keep in touch with as many as he possibly can every day. He acquires his prospects largely by obtaining the names of friends of customers he already has sold. And, if he is a wise salesman, he will keep in touch with his owners every two or three weeks during the summer to get the names of those who have been in to admire the equipment, and also to keep the customer continually reminded that she has such equipment and therefore should be proud of her possession.

For the first week or two, after an electric refrigerator has been installed, the housewife talks about it almost continually with her friends. Then she gradually drops the subject unless the salesman calls upon her frequently for the alleged purpose of learning how well the machine is working. These visits keep up the lady's interest and enthusiasm and, if the salesman is on to his job, he will drop timely remarks concerning the convenience of the equipment and other points covered in his pre-sale talk, which she will pass along to her friends.

A Different Story for Commercial Work

But this type of salesmanship does not work in the commercial field. Here the salesman must forget, almost, the convenience and pride of possession appeals and must emphasize practicability and economy. He must show the butcher, for example, that he can save money by installing an electric refrigerator. He must ascertain beforehand, if he can, about how much the butcher is paying each month for ice. With this figure the salesman has something definite to work on.

The usual reply to the salesman's first suggestion that Mr. Butcher install an electric refrigerator is to the effect: "Can't afford it; business is rotten; electric refrigerators cost too much money." If the salesman has previously estimated what it will cost to give his prospect the right kind of equipment, he can come right back with the proposition that refrigeration by electricity costs less money than refrigeration with ice and is better.

Use Figures, Not Generalizations

The salesman can also point out the savings that are made by preventing spoilage. What applies to sales to butcher shops applies to other lines of retail business, indicating that the salesman on commercial establishments must have his figures and facts to present.

Then we come to the business man—the investor. Apartment house installations, water coolers, etc., come in this classification. The salesman in these fields must be of a still different type. Facts and figures are very important. The apartment house owner and the owner of an office building look upon electric refrigeration as an investment. They must be shown conclusively that such installations are profitable investments.

Two Types of Apartment Installations

In this field we have two types of apartment houses. First, is the new apartment under construction; the second is the old structure which should be brought up-to-date. The sales approach in the two fields is different. Considering the latter—the old house that should be made modern—the salesman presents his argument on the grounds that the owner is headed for losses. A typical case is to find a house with several apartments unoccupied near a modern structure that has nearly every apartment filled, then seek the owner and point out that one of the reasons why he is not renting all of his apartments is because the newer houses are equipped with electric refrigerators and that the housewives of today are not content with old-fashioned service. The salesman arouses interest, then he can do some figuring to ascertain the cost. He appeals from the standpoint of saving the money already invested.

Considering the new structures, the salesman must contact architects, contractors and builders and know exactly what he is talking about. He must spend days analyzing the building plans and showing how it should be installed. He must appeal to his prospects on the grounds of increasing the value of the investment.

The same type of salesman is required for installations in office buildings. Water cooling systems offer him an opportunity. And in this work the salesman contacts the builder, the architect and the contractor.

The house-to-house salesman gets his business by making many calls in the course of a day and picturing the convenience of such equipment; the commercial salesman makes fewer calls and appeals from the standpoint of economy. The salesman assigned to remodelled apartment houses works still slower and more intensely, while the man assigned to new apartment houses and office buildings works the slowest of them all, perhaps spending weeks on the same prospect.

I do not believe that it is practical to expect the house-to-house salesman to handle a commercial job, and vice versa. I believe that the well organized sales force will consist of men of three types at least, and better still, four. The new building salesman is a highly specialized type. Competition from the price standpoint is strenuous. He must be a bargainer and figure very accurately.

The housewife usually knows that she *wants* an electric refrigerator. The business man doesn't know he wants it; the salesman must make up his mind for him.

Opportunities In Electric Refrigeration

I believe there is greater opportunity for salesmen in electric refrigeration today than in any other line of endeavor. Not more than two per cent of the people have such equipment. We have unlimited opportunities. The farm business has scarcely been touched. We have the summer home yet to equip and this is a big field. There are so many angles to our opportunities that the game is extremely fascinating, and it is not difficult to keep up enthusiasm.

Opinions Regarding the Need and Opportunities for an Industry Association

Industry Needs an Organization in Order to Function Intelligently

"There is always a distinct advantage to manufacturers in any line of business endeavor to work together as a unified group in the solving of various important problems.

"That an organization or association of manufacturers of electric refrigeration is badly needed, as in other industries, in order to function intelligently and profitably.

"Electric refrigeration is a definite and distinct field—this is an age of industrial organizations and unless an organization is formed we shall be chaotic in our activities and continue to practice all of the methods that have been relegated to the rear by other associations who have developed ethics and ideals as applied to their respective lines of business endeavor."—David A. Brown, president, General Necessities Corporation, Detroit, Mich.

BETTER UNDERSTANDING WHEN MEN GET TOGETHER TO EXCHANGE IDEAS

"We have been asked for our opinion of the need of opportunity for an industry organization. We feel that we answered this question in 1925 when we joined the Electric Refrigeration Council as one of only five or six members and contributed $20,000 to the Council to further the sale of electric refrigeration.

"There is a real genuine need for an organization where manufacturers can gain through contact with one another, through discussion of matters of mutual interest, the exchange of ideas and the better understanding of each other's views and purposes that always come when men get together who are sincere in the advancement of a cause or industry."—W. D. McElhinny, vice-president in charge of sales, Copeland Sales Co., Detroit, Mich.

Both a Need and An Opportunity

"We believe that there is both a need as well as an opportunity for organization of the industry."—Paul W. Petersen, vice-president, Absolute Con-Tac-Tor Corp., Elkhart, Ind.

Constructive Effort Needed

"We believe the industry needs to have a constructive organization."—E. L. Warner, secretary, The Warner Steel Products Co., Ottawa, Kans.

Will Cooperate Fully in Work of Standardization

"Without doubt, there is a need for an industry organization, and it will be the policy of the Benjamin Electric Mfg. Company to co-operate to the fullest possible extent in the work of standardization."—P. A. Powers, refrigeration sales manager, Benjamin Electric Mfg. Co., Chicago, Ill.

Great Need for Standardization

"We believe there is a vital need for an industry organization which will standardize as far as possible the various parts used in electric refrigeration. We have found that almost no two refrigerator designs will permit the use of any one design of seal, expansion valve, float valve, or control."—E. J. Leach, secretary and treasurer, Leachwood Co., Janesville, Wisc.

Suggests Organizing as a Section of the N. E. M. A.

"We believe there is a very great necessity for industry organization but that this should be done as a section of the National Electrical Manufacturers' Association, a working organization now, with recognition and centralized control."—H. W. Alexander, general manager, refrigeration division, Lamson Co., Syracuse, N. Y.

Industry Organization Would Be Beneficial

"We believe that an industry organization operating along the right lines would be beneficial."—G. E. Weissenburger, president, Keokuk Refrigerating Co., Keokuk, Iowa.

Proposes an Association to Include all Manufacturers—and Ice Companies

"It is our opinion that the time is ripe for an association that would involve all the refrigerator makers of every kind, ice machine makers of every kind and the ice industry. Our interests are all mutual in giving the customer refrigeration. Each article and item has its place and can be worked out without strife.

"At least we can leave with the customer the idea that by all means he should use refrigeration of some kind without having the thought left in his mind that he is going to get stung no matter which one he deals with.

"The writer was president of the American Refrigerator Association for three years and I realize that we should be on the basis like the automobile business has been built up, whereby every builder gives you the impression that you should have an automobile by all means whether you buy his or not, and that is what we need in the refrigeration game instead of so much knocking."—F. L. Northey, president, Northey Mfg. Co., Waterloo, Iowa.

Frigidaire Dealers Meet at Fort Dodge

Frigidaire dealers within a thirty mile radius of Fort Dodge, Iowa, met on December 2, at the Wahkonsa Hotel in that city at an informal business meeting at which L. W. Curl, of Dayton, was the principal speaker. John P. Tecford, Des Moines branch manager, was also in attendance at the meeting.

Walker Electric Starts Manufacturing in Port Huron

Operations have been started in the plant of the Walker Electric Refrigeration Co., Port Huron, Mich., which was moved there from Detroit recently. H. J. Walker, president and general manager of the concern, states that the production capacity of the new plant will be 150 units a day for the first year.

Electric Refrigeration Directory

Manufacturers of Machines, Cabinets, Materials, Parts and Accessories with Executive Personnel and Specifications

** ABSOLUTE CONTACTOR **

Absolute Con-Tac-Tor Corporation, Elkhart, Indiana.
Manufacturers of Mercury CON-TAC-TORS and automatic electric controls for both refrigeration and oil burner installation.
L. A. M. Phelan, pres.; Paul W. Peterson, vice-pres.; R. L. Patrick, sec.; Alex Jager, treas.; L. E. Koch, chief engineer; J. Zwolanek, sales manager.

Absopure—See General Necessities Corp.

Acme White Lead and Color Works, Detroit, Mich.
Manufacturers of lacquer enamels, clear enamels, oil enamels, interior refrigerator finishes, primers, sealers and varnishes.

Advance Electric Co., 6315 Maple Ave., St Louis, Mo.
Manufacturers of ADVANCE motors for commercial electric refrigeration machines.
Edward Bretch, pres.; A. L. Canavan, vice-pres.

Airaplex Frigidarium Corp., Minneapolis, Minn.
Manufacturers of AIRAPLEX household refrigeration utilizing air as a refrigerating medium and gas or liquid fuel as a source of energy.
L. H. England, president and general manager; A. F. England, vice-pres.; F. F. Zander, secretary and treasurer.

** ALASKA **

The Alaska Refrigerator Company, Muskegon, Michigan.
Manufacturers of ALASKA electric refrigerator cabinets.
E. J. Rock, pres.; J. L. Gillard, gen. mgr.; J. L. Collier, director of sales.

Albaugh-Dover Mfg. Co., 21 Marshall Blvd., Chicago, Ill.
Manufacturers of AD gears.
P. A. Mortenson, pres.; O. Dover, vice-pres.; F. G. Eppley, vice-pres.; W. E. Smith, sec.; E. W. Buck, treas.; O. Dover, gen. mgr.; M. T. Welters, pur. agt.; W. R. Schwab, chief engr.; E. F. Eppley, wks. mgr.

The Allen Filter Co., 25-43 South St. Clair Street, Toledo, O.
Manufacturers of water coolers for electric refrigeration.
E. P. Mull, pres.; W. S. Ramsay, vice-pres., fact. mgr., and pur. agt.; G. D. Taylor, sec.

All Sheet Metal Works, 2949 Elston Ave., Chicago, Ill.
Manufacturers of household, commercial, ice cream and soda fountain electric refrigerator cabinets; water coolers; combination ice cream cabinets; water coolers; brine tanks and bunkers
P. J. Wanbach, pres.; L. C. Campbell, sec. and treas.

Aluminum Company of America, General Sales Office, Pittsburgh, Pa.
Manufacturers of aluminum sheet and moulding for refrigerator trimming. Also aluminum ingot, permanent mould castings, die castings, sand castings, forgings, tubing wire, rod, aluminum bronze powder, automobile screw machine products, stampings, and fabricated parts.
R. E. Powell, assistant sales manager, Pittsburgh, Pa.

American Engine and Airplane Co., Los Angeles, Cal.
Manufacturers of household electric refrigerators and control devices.
Ralph M. Burdick is president.

American Engineering Co., Kensington Station, Philadelphia, Pa.
Manufacturers of JURUICK commercial, ice cream and soda fountain units.
Maxwell Alpern, pres.; W. V. Sauter, vice-pres.; C. L. Cushmore, sec. and treas.; H. L. Lewis, sales mgr. refrigeration department; J. G. Worker, gen. sales mgr.; J. M. Combs, adv. mgr.; E. W. Scharninghausen, pur. agt.; H. A. Peck, wks. mgr.; O. A. Johnson, fact. engr.

American Ice Machine Co., Glendale, Cal.
Manufacturers of SNOW BIRD and AMERICAN domestic refrigeration and cabinets.
L. P. Zahn, pres.; L. E. Zahn, vice-pres.; E. Z. Belden, sec.; George Cooper, pur. agt.; E. W. Brown, chief engr.; Frank Chase, adv. and sales promotion mgr.

** AMERICAN RADIATOR **

American Radiator Company, 816 South Michigan Avenue, Chicago, Ill.
Industrial Division—Factories at Springfield, Ill., and Detroit, Mich. Offices at 40 W. 40th St., New York City; 374 Delaware, Buffalo, N. Y.; 906 Davidson Bldg., Kansas City; 1214 Quinby Bldg., Los Angeles, Cal.
Manufacturers of AMERICAN domestic refrigerating units, automatic expansion valves, float valves and job castings per specifications.
Accessories Division—Factory at Detroit, Mich.
Manufacturers of MERCOID controls for domestic and commercial refrigeration.

American Rolling Mill Co., Middletown, O.
Manufacturers of enameling stock, galvanized ARMCO ingot iron, alloy coated steel, alloy coated ingot iron.

American Solder & Flux Co., 2910 No. 16th St., Philadelphia.
Manufacturers of self-fluxing solders and fluxes.
F. D. McBride, president.

** ANSUL CHEMICAL **

Ansul Chemical Co., Marinette, Wis.
Manufacturers of ANSUL sulphur dioxide.
F. G. Hood, pres.; H. V. Higley, sec.; W. E. Pflieger, chief chemist; L. C. McKesson, traffic manager.

Arcade Mfg. Co., 1212 E. Shawnee St., Freeport, Ill.
Manufacturers of household and commercial refrigerator hardware, hinges, locks, corners, traps, etc.
E. H. Morgan, pres.; L. L. Munn, vice-pres.; I. P. Gassman, sec.; B. C. Trueblood, treas.; L. L. Munn, gen. mgr.; I. P. Gassman, sales and adv. mgr.; T. J. Bordner, pur. agt.

Arlington Refrigerator Co., Inc., Arlington Vermont.
Manufacturers of ARLINGTON, ARCO and ARCOSTONE household electric refrigerator cabinets.
John P. Munn, M.D., pres.; C. M. Rochester, treas.; A. M. Johnstone, sec. and mgr.; A. M. Johnstone, gen. mgr.; B. F. Leonard, sales mgr.; R. R. Casey, fact. mgr.

Armstrong Cork & Insulation Co., 24th St. and Allegheny River, Pittsburgh, Pa., Branch of Armstrong Cork Co. Factories at Beaver Falls, Pa., Camden, N. J., and Seville, Spain.
Manufacturers of corkboard insulation; cork pipe covering.
C. D. Armstrong, pres.; C. D. Armstrong, vice-pres.; C. R. Lyle, vice-pres.; C. D. Armstrong, Jr., gen. mgr.; C. R. Lyle, sales mgr.; S. L. Barnes, adv. mgr.; E. E. Baker, pur. agt.

Armstrong Machinery Co., Spokane, Wash.
Manufacturers of ammonia compressors and refrigerating equipment. Domestic, butcher, hotel, creamery, restaurant or packing plant equipment, 17 sizes, in ¼ to 30 ton capacity. Trade names, SPOKANE, SIBERIAN, ALASKAN, ICELANDER, CHILKOOT.
D. F. Kizer, pres.; L. B. Armstrong, vice-pres.; Stanley Mayall, sec.-treas.; Harry Mayall, sales mgr.

** ATLAS PLYWOOD **

Atlas Plywood Corp., 934 Park Square Bldg., Boston, Mass. Factories at Stockholm, Me., Greenville, Me., Richford, Vt., Montgomery Center, Vt., Morrisville, Vt.
Manufacturers of ATLAS refrigerator cases, plywood shipping containers for refrigerators.
R. M. Buck, pres.; T. R. Winchell, vice-pres.; E. M. Soucy, treas.

Audiffren Refrigerating Machine Co., 285 Madison Ave., New York, N. Y.; factory at Jersey City, N. J.
Manufacturers of AUDIFREN electric refrigerators for household and commercial use.
E. T. Hargrove, pres.; K. D. Perkins, vice-pres. and treas.

** AUTOMATIC FREEZER **

Automatic Freezer Syndicate. Office, 1716 Ford Bldg., Detroit.
Manufacturers of CARE-FREE commercial and household electric refrigerators, specializing in corrosion-proof self-dehydrating systems.

** AUTOMATIC RECLOSING **

The Automatic Reclosing Circuit Breaker Co., Sixth and Wesley Aves., Columbus, Ohio.
Manufacturers of manual, magnetic and automatic reclosing circuit breakers. Starters, contactors, relays, and switches.
E. C. Raney, general manager and chief engineer; C. M. Hickle, sales manager.

Baker Ice Machine Co., Inc., 3601 N. 16th St., Omaha, Nebr.
Manufacturers of BAKER SYSTEM electric refrigeration units for commercial, ice cream and soda fountain use, pumps and compressors, coils.
J. L. Baker, pres.; Charles Knox, vice-pres.; F. J. Vette, sec.; C. A. Baker, treas.; L. W. Morris, sales mgr.; R. C. Hudson, adv. and sales promotion mgr.; C. A. Baker, pur. agt.; Charles Knox, chief engr.; J. H. Coesfeld, supt.

Baldwin Refrigerator Co., Burlington, Vt.
Manufacturers of refrigerator cabinets.
George A. Hall, pres.; Ernest E. Smith, sec. and mgr.; H. T. Rutter, treas.

Banta Refrigerator Company, Clearfield, Pa.
Manufacturers of BANTA commercial cabinets.
L. A. Banta, pres.; W. A. Walker, vice-pres.; J. Lewis Irvin, sec.; F. B. Kerr, treas.; W. H. Walker, gen. mgr.; W. B. McBride, pur. agt.; G. F. Banta, supt.

Beaver Machine & Tool Company, Inc., 625 North Third Street, Newark, N. J.
Manufacturers of various wire device connections such as attachment plugs.
Ernest B. Slade, pres.; Harold E. Slade, vice-pres. and sec.; James M. Wolf, treas.; Ernest B. Slade, gen. mgr. and sales mgr.; Harold E. Slade, adv. mgr. and pur. agt.; John Gehring, chief engr.; Louis E. Eisele, fact. supt.

Belding-Hall Electrice Corporation, Belding, Mich. Brinton F. Hall, U. S. Court Receiver.
Manufacturers of Belding-Hall ELECTRICE household and commercial electric refrigerator units, and cabinets.
Arthur E. Swanson, pres.; Brinton F. Hall, vice-pres. and treas.; Guy D. Weter, sec.

Specifications

Trade name, Electrice; Refrigerant, sulphur dioxide; Compressor, rotary, air cooled; Control, mercury thermostatic.

Self Contained Units

Model Motor Capacity	Shelves Trays Cubes	Width Depth Height	Finish Ext. Int.	Insulation
SK-5 ⅛ H. P. 4.9 cu. ft.	7.6 sq. ft. 3 36	26 19¾ 52½	 Wh. Lacq. Porc.	 2"-3" Corkb'd
SA-6 ¼ H. P. 6 cu. ft.	8 sq. ft. 4 48	26½ 22¾ 57½	 Wh. Lacq. Porc.	 2"-3" Corkb'd
SA-7 ¼ H. P. 7½ cu. ft.	9¾ sq. ft. 5 60	 	 Wh. Lacq. Porc.	 2"-3" Corkb'd
SA-9 ¼ H. P. 9 cu. ft.	13½ sq. ft. 5 60	34¾ 22¾ 62	 Wh. Lacq. Porc.	 2"-3" Corkb'd
SA-14 ¼ H. P. 9 cu. ft.	22¼ sq. ft. 10 120	50½ 23¾ 62	 Wh. Lacq. Porc.	 2"-3" Corkb'd

** BENJAMIN CRYSTEEL **

Benjamin Electric Mfg. Co., 128 S. Sangamon St., Chicago, Ill. Factory at Desplaines, Ill.
Manufacturers of BENJAMIN CRYSTEEL cabinets for household and commercial electric refrigerators; enameling; refrigerator linings; seamless, porcelain enameled.
R. B. Benjamin, pres.; J. H. Fall, Jr., vice-pres. and treas.; W. D. Steele, vice-pres. and sec.; P. A. Powers, sales mgr.; E. A. Drake, works mgr.; E. D. Pellegrin, engineer refrigeration department.

Berry Brothers, 211 Lieb St., Detroit, Mich.
Manufacturers of BERRYLOID LACQUER LIONOIL, enameling, rustproofing materials, varnishes and stains.
F. L. Colby, pres.; W. R. Carnegie, vice-pres.; George V. Blenkarn, treas.; F. L. Colby, Jr., secretary.

** BOHN SYPHON **

Bohn Refrigerator Company, 1350 University Ave., St. Paul, Minn.
Manufacturers of BOHN SYPHON cabinets for household electric refrigerators.
G. C. Bohn, pres.; Harold H. Bohn, vice-pres.; R. H. Ames, sec. and treas.; Abner Davis, Jr., sales mgr.; George Young, comptroller; P. O. Schneidler, traffic mgr.; H. O. Fitch, order department; A. M. Hoff, works mgr.; Fred Frough, fact. supt.; T. I. Elliott, New York store mgr.; A. M. Nordland, Chicago store mgr.; B. L. von Nieda, Boston store mgr.

** BRADLEY-HURTZ **

Bradley-Hurtz Co., 2626 S. Dearborn, Chicago, Ill.
Manufacturers of enamels, lacquers, varnishes and paints.
Franklin Bradley, pres.; Frederick J. Hurtz, vice-pres.; W. H. Steiner, northwestern sales mgr.; Edw. Slowey, dist. sales mgr., 2200 Madison Rd., Cincinnati, O.; C. H. Dragert, 366 Oakland, Brooklyn, N. Y. (mgr. N. Y. Branch factory); J. W. Longworth, dist. representative, 1955 Plainfield Ave., Grand Rapids, Mich.

Note

** NAMES IN BOLD CAPS MARKED THUS **

See advertisement in this issue of Electric Refrigeration News. Index of advertisers on first page.

Electric Refrigeration Directory (Continued)

** Names marked thus—See Advertisement in this issue **

Brooks Cabinet Co., Inc., 1028 West 27th St., Norfolk, Va.
Manufacturers of BROOKS CABINETS for household, commercial, ice cream and soda fountain electric refrigerators; water coolers.
C. H. Brooks, pres.; C. T. Brooks, vice-pres.; J. N. Taylor, sec.-treas.

Brunswick-Kroeschell Co., Jersey Ave., New Brunswick, N. J.
Manufacturers of BRUNSWICK commercial electric refrigerators, other control devices.
James W. Johnson, pres.; Sydney B. Carpender, vice-pres. and gen. mgr.; Arnold H. Goelz, vice-pres. and chief engr.; Robert A. Kroeschell, sec. and sales mgr.; William Carpender, treas.; H. Harrison, adv. mgr.; Walter Jones, prod. mgr.

Bryant Pattern & Mfg Co., 702-710 St. Antoine St., Detroit, Michigan.
Manufacturers of commercial refrigerating machines of 300 to 400 pounds capacity for ice cream cabinets, butcher display cases, etc., together with compressors, patterns, dies, etc.
A. W. Bryant, vice-pres. and engr.; E. S. Bryant, sec.-treas. and mgr.; A. W. Bryant, pur. agt.; E. J. Mamer, sales and adv. mgr.; E. S. Bryant, fact. mgr.

Specifications

Trade name—BRYANT; Refrigerant—Sulphur dioxide; Compressor—Reciprocating; Control—Thermostat.

Remote Installations

Model	Motor	Ice Melting Effect	Ice Cubes	Lbs.
J-5	¼ H.P.	50 lbs.	56	4.10
J-10	¼ H.P.	60 lbs.	84	6.15
S-12	¼ H.P.	90 lbs.	108	8.4
SS-20	¼ H.P.	110 lbs.	144	11.2

** BUSH CONDENSER **

Bush Mfg. Co., 100-110 Wellington St., Hartford, Conn.
Manufacturers of seamless copper tubing condensers with individual fins.
Richard J. Goodman, pres.; James W. Hatch, gen. mgr.; Charles W. Cooksley, prod. mgr.; O. L. Seward, engr.; Edward M. Flannery, pur. agt.

Cameo Refrigerator Corporation, 973 North Main Street, Los Angeles, Cal. Factories at Los Angeles and Vernon, Cal.
Manufacturers of CAMEO cabinets; enamelers.
Joseph T. Penton, pres.; R. B. Ahlswede, vice-pres.; N. W. Neice, sec. and sales mgr.; E. E. Radeck, treas. and gen. mgr.; Earl Bartholomew, fact. mgr.

Campbell-Shirk Co., 3200-10 Auer Ave., Milwaukee, Wis.
Manufacturers of commercial, hospital, and special refrigerators for electric refrigeration.
R. F. Campbell, pres.; G. C. Kohlhardt, sec.-treas.; Harry Buechler, supt. of fact.

Castle Refrigerating Machine Co., 138 Neal St., Indianapolis, Ind.
Manufacturers of complete units for commercial use, 2 to 15 tons; electric refrigeration equipment for ice cream manufacturing; ammonia condensers; brine tanks for commercial use.
O. H. Castle, manager and owner.

Century Electric Company, 1806 Pine Street, St. Louis, Mo.
Manufacturers of motors for household and commercial electric refrigerators.
E. S. Pillsbury, pres.; R. J. Russell, vice-pres. and sec.; J. L. Woodress, sales mgr.

Champion Electric Co., division of Champion Shoe Machinery Co., 3711-41 Forest Park Ave., St. Louis, Mo.
Manufacturers of CHAMPION ELECTRO ICER machines for household and commercial use, motors, pumps and compressors, condensers and expanders.
Geo. A. Dobyne, pres.; S. A. Dobyne, gen. mgr.; Stanley C. Bell, sales and adv. mgr.; Charles Vogler, pur. agt.; S. A. Dobyne, chf. eng.

Challenge Refrigerator Co., Grand Haven, Mich.
Manufacturers of CHALLENGE cabinets for household electric refrigerators.
H. F. Harbeck, pres.; W. H. Harbeck, vice-pres.; B. F. Harbeck, sec.-treas.

Chicago Mill & Lumber Co., 510 North Dearborn St., Chicago, Ill.
Designers and manufacturers of boxes and crates for the shipment of refrigerator cabinets, units and parts.
W. P. Paepcke, pres.; W. D. Burr, sales mgr.

** CLEVELAND **

Cleveland Iceless Cooler Co., 961 E. 63rd St., Cleveland, Ohio.
Manufacturers of KOLD STREAM electrically refrigerated water coolers.
E. H. Baker, Jr., president; John C. Barker, vice-president; H. H. Burton, secretary; J. E. Tomer, assistant secretary; E. H. Baker, Jr., treasurer; J. E. Tomer, assistant treasurer; C. E. Yates, engineer.

Specifications

Trade name—KOLD STREAM; Refrigerant—sulphur dioxide; Compressor—reciprocating; Control—thermostat; Motor—⅛ H. P.; Height, without bottle 45"; Diameter, 18¾"; Lacquer finish; Corkboard insulation; Net weight, 170 lbs.; Shipping weight, 210 lbs.; Price F. O. B. $175.

Clover-Olson Refrigerator Co., 6551 San Pablo Ave., Oakland, Calif.
Manufacturers of CLOVER-OLSON electric refrigerators for household, commercial, ice cream and soda fountain use; pumps and compressors; float valves, automatic pressure controls, ammonia machine to 6-ton capacity.
E. F. Clover, pres.; C. F. Olson, sec.-treas.; D. P. Eicke, vice-pres.

** CLIMAX **

Climax Electrical Refrigeration Co., 4th St. at 18th Ave., Clinton, Iowa. Subsidiary of the G. W. Dulany Trust, 111 W. Monroe St., Chicago, Ill.
Manufacturers of CLIMAX Electric Refrigeration units for household, ice cream cabinet, soda fountain, florist, delicatessen and general commercial purposes.
G. W. Dulany, Jr., chairman of the board, Chicago, Ill.; E. B. Mallory, pres. Chicago, Ill.; E. F. Deacon, vice-pres., Chicago, Ill.; W. E. Eberhart, Jr., treas., Chicago, Ill.; J. M. Thompson, sec., Chicago, Ill.; R. L. Alexander, director of engineering and manufacturing, Clinton, Iowa; J. N. Palmer, sales mgr. and director of pub., Clinton, Iowa; Walter Johnson, pur. agt., Clinton, Iowa; C. W. Albertson, research engr., Clinton, Iowa.

Specifications

Trade name, CLIMAX; Refrigerant (Models D, E, F & G), methyl chloride, (Models A, B, C, C-J) ammonia; Compressor (Models C, C-J, E, F & G) rotary, (Models A & B) reciprocating; Control, automatic.

Remote Installations

Model	Motor	Capacity	Ice Cubes	Net Wt.
G	⅛ H. P.	4-9 cu. ft.	36-60	86 lbs.
F	¼ H. P.	9-30 cu. ft.	36-268	127 lbs.
E	⅓ H. P.	300 lbs.	268-480	204 lbs.
D	½ H. P.	500 lbs.		224 lbs.
C-J	1 H. P.	½ ton		520 lbs.
C	2 H. P.	1 ton		750 lbs.
B	3 H. P.	2 tons		1200 lbs.
A	7½ H. P.	4 tons		2000 lbs.

Coldak Corp., 8 West 40th St., New York, N. Y. Factories at Springfield, Mass.; Providence, R. I., and Muskegon, Michigan.
Manufacturers of COLDAK electric refrigerators for household and commercial use.
J. H. Pardee, pres.; E. J. Rock and C. M. Burnhome, vice-pres.; T. W. Moffat, treas.; H. B. Brown, sec.; Hazor J. Smith, chief engr.; C. B. Shepard and W. A. Blackwood, assistant engrs.; W. B. Reed, serv. mgr.

** COMMONWEALTH BRASS **

Commonwealth Brass Corporation, 5781-5835 Commonwealth Ave., Detroit Mich.
Manufacturers of brass pipe and tube fittings, forged brass parts, and automatic screw machine products.

** COOKE SEAL **

Cooke Seal Ring Co., 20 N. Green St., Chicago, Ill.
Manufacturers of COOKE Seal Rings.
P. D. Dwight, pres.; N. A. Henwood, vice-pres. and gen. mgr.; L. J. Bulkley, sec.-treas.; C. S. Kellum, fact. mgr.

Cooke Electric Refrigeration Co., 14-30 N. Green St., Chicago, Ill.
Manufacturers of COOKE for household, commercial and ice cream cabinets.
George J. Cooke, pres. and treas.; George J. Cooke, Jr., vice-pres.; Robert E. Cooke, sec.

Specifications

Trade name, Cooke; Refrigerant, Ammonia; Compressor, Reciprocating; Control, Thermostat.

Remote Installations

Model	Motor	Capacity	Ice	Cubes	Net Wt.
15	⅛ H. P.	0-15	7½ lbs.	48	100 lbs.
40	¼ H. P.	15-40	12 lbs.	72	150 lbs.

** COPELAND PRODUCTS **

Copeland Products, Inc., Detroit, Mich.
Manufacturers of COPELAND commercial and household refrigerators.
William Robert Wilson, pres.; George W. Mason, vice-pres. and gen. mgr.; Edwin H. Brown, secy. and treas.; D. E. Knowles, asst. secy., treas. and comp.; W. D. McIlhinny, vice-pres. in charge of sales; A. M. Taylor, adv. and sales promotion mgr.; B. P. Watkins, pur. agt.; Glen Muffly, chief eng.; S. W. Taylor, fact. mgr.; E. L. Barger, serv. mgr.

Specifications

Trade name, COPELAND; Refrigerant, Freezol; Compressor, reciprocating; Control, thermostat; V belt drive; cooling tank.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Const. Ext. Int.	Insulation Net Wt. Price
N-5	6¾ sq.ft. 6.6 lbs.	24⅛ 22¼ 55½	Steel Wh. lc. Wh.en.	2" Celotex 405 lbs. $195 f.o.b.
5 cu. ft.	108			
C-5-P	7.64 sq.ft.	28 22 60¼	Steel Wh. lc. Porc.	2" Corkb'd 350 lbs. $280 f.o.b.
5 cu. ft.	90			
C-5-AP	7.9 sq.ft. 6.6 lbs.	28 22 60¼	Porc. Porc.	2" Corkb'd 370 lbs. $310 f.o.b.
5.35 cu. ft	108			
CS-7-10	11 sq.ft.	36¼ 22¼ 62½	Porc. Porc.	2" Corkb'd 420 lbs. $355 f.o.b.
10.1 cu. ft.	105			
CS-9-12	11.81 sq.ft.	35½ 21⅜ 70¼	Porc. Porc.	2"-3" Ckbd. 470 lbs. $425 f.o.b.
11.88 cu. ft.	189			
CS-11-15	15.4 sq.ft.	40¼ 23¼ 72	Porc. Porc.	2"-3" Ckbd. 545 lbs. $471 f.o.b.
15.5 cu. ft.	189			
CS-14-22	22.3 sq.ft.	46 24¾ 70	Porc. Porc.	2"-3" Ckbd. 565 lbs. $510 f.o.b.
18.4 cu. ft.	243			
CS-16-23	22.5 sq.ft.	55¼ 23¼ 70	Porc. Porc.	2"-3" Ckbd. 565 lbs. $570 f.o.b.
20.75 cu.ft.	243			

Remote Installations

Model Motor	Capacity Cubes	Width	Depth	Height
5 ⅛ H.P.	0-5 cu.ft. 90	5½	14	16½
6 ⅛ H.P.	30	8	9½	14¼
8 ⅛ H.P.	0-10 cu.ft. 90	10	9½	12
10 ⅛ H.P.	10-15 cut.ft. 105	10	11	13
15 ⅛ H.P.	15-20 cu.ft. 189	10	13	15
20 ⅛ H.P.	20-30 cu.ft. 243	11	13	17
30 ⅛ H.P.	30-40 cu.ft. 297	12	13	21
40 ⅛ H.P.	40-50 cu.ft. 390	14	15	24

Compressors

Model F or G—1 cylinder reciprocating; ⅛ H.P.
Model H— 2 cylinder reciprocating; ⅓ H.P.
Model N— 1 cylinder reciprocating; ⅛ H.P.

Water Coolers

Model K—Single cylinder compressor, ⅛ H. P.; Capacity 6 gallons per hour, 18½" square; Height, with city water 47½", with bottled water 65½"; Finish, green lacquer on steel; Insulation, 3" cork; Bowl, white porcelain with nickeled brass fittings.

Model L—Single cylinder compressor, ¼ H. P.; Capacity 8½ gallons per hour; Dimensions, finish, and insulation same as Model K.

Model M—Two-cylinder compressor, ⅓ H. P.; Capacity 14 gallons per hour; Dimensions, finish, and insulation same as Model K.

Copeland Commercial Systems

For refrigerators usually found in restaurants, grocery stores, floral shops, etc.

A system consists of a two-cylinder condensing unit, an automatic control, an expansion valve and one or more of the tanks listed below.

No. SP-167—Overall dimensions with attachments, 12" wide, 18" deep, 29¾" high. For Seeger cabinets numbers 412, 413, 417, 422, 426, or other boxes of 50 cubic feet capacity.

No. SP-168—Overall dimensions with attachments, 19" wide, 16" deep, 27¾" high. For McCray cabinets, numbers 96, 120, 720, 785, or other boxes of 55 cubic feet capacity.

No. SP-169—Overall dimensions with attachments, 20" wide, 18" deep, 29¾" high. For McCray cabinets, numbers 132, 410, 411, Belding Hall cabinets, numbers 4100, 4150, 4160, 4161, 4162, 4165, 4166, 4167, 4170, or other boxes of 70 cubic feet capacity.

No. SP-171—Overall dimensions, 15" wide, 20" deep, 31¾" high. For Seeger cabinets, numbers 418, 421, 429, or other boxes of 70 cubic feet capacity.

No. SP-172—Overall dimensions, 14" wide, 28" deep, 31¾" high. For Seeger cabinets, numbers 427, or other boxes of 80 cubic feet capacity.

All commercial tanks are regularly furnished without ice trays. All tanks have vertical flues to promote rapid air circulation.

** CORK IMPORT **

Cork Import Corp., 345 W. 40th St., New York, N. Y. Factories at Port Newark, N. J., and at Palafrugell, Palamos Figueras Bagur Santa Cristana, Fegenal de la Sierra and Caceres, Spain.
Manufacturers of NOVOID corkboard, NOVOID cork covering.
H. H. Straus, pres.; W. V. Landeck, vice-pres.; T. N. Word, secy. and treas.; J. H. Stone, gen. sales mgr.; Wm. F. Grupe, chief eng.; J. L. Bauer, sales mgr.; F. G. Cart, Jr., asst. sales mgr.; A. W. Morse, adv. agt.; and P. Eberle, pur. agt.

Crystal Refrigerator Co., Fremont, Neb.
Manufacturers of CRYSTAL and WHITE-STEEL household and commercial cabinets, chocolate candy display cases and grocers' display cases.
Frank Hammond, pres.; Dan V. Stephens, vice-pres.; Earl R. Hammond, secy.; R. E. Hammond, treas.

The Dent Hardware Co., Fullerton, Pa.
Manufacturers of hardware (fasteners, latches, corners, traps, hinges, etc.) for domestic and commercial refrigerators.
H. H. Dent, pres.; H. P. Newhard, secy. and gen. mgr.; C. C. Kaiser, treas.; H. C. Dent, asst. sales mgr.; and John A. Storm, fact. mgr.

Dillingham Manufacturing Co., Sheboygan, Wis. Manufacturers of ICEBERG cabinets for domestic electric refrigeration.
Harry E. Barrows, pres.; O. H. Clark, vice-pres. and treas.; A. D. Barrows, chairman board of directors; Keith Osborn, secy.; O. J. Loersch, asst. mgr.

** DOLECO **

Dole Refrigerating Machine Co., 1209 Washington Blvd., Chicago.
Manufacturers of DOLECO refrigerating machinery for commercial and domestic use.
Andrew R. Dole, pres.; H. W. Kleist, vice-pres.; F. H. Tweed, treas.; J. D. Hollowell, secy. and gen. mgr.

Specifications

Trade name--DOLE CO.; Refrigerant—ammonia; Compressor — reciprocating; Control — thermostat.

Commercial Compressors

Type A—¼ H. P.; maximum capacity 75 cu. ft.; 120 ice cubes; applicable to household use.

Type B—½ H. P.; maximum capacity 350-400 cu. ft.

Type C—1 H. P.; maximum capacity 700-800 cu. ft.

The Domestic Electric Co., 209 St. Clair Ave., Cleveland, Ohio.
Manufacturers of DOMESTIC motors for household and commercial electric refrigerators.
C. A. Duffner, pres.; M. H. Spielman, vice-pres.; A. N. Kellogg, treas.; C. A. Duffner, gen. mgr.; E. S. Sabin, sales mgr.; M. W. Phelps, pur. agt.; J. D. Cole, chief eng.; W. H. Poesse, works mgr.

Domestic Electric Refrigerator Corporation, 2 West 46th St., New York City. Factories at West Chester, Pa.
Manufacturers of ALLISON household electric refrigerating machines.
Julius Fleishman Holmes, pres.; Fred Allison, vice-pres.; A. L. Kull, vice-pres. and gen. mgr.; Hamilton L. Shields, secy.-treas.; John A. Sturges, sales mgr.; George Hotte, sales promotion mgr.

Specifications

Trade name—ALLISON; Refrigerant—ethyl chloride; Compressor—rotary; Control—thermostat. **PLYMETL** cabinet.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Finish Ext. Int.	Installation Net Wgt. Price
5	6.8 sq. ft.	26		Corkb'd
⅛ H. P.	9 lbs.	22	Lacq.	340 lbs.
5.5 cu. ft.	72	61 11/16	Enam.	$255
7	10.3 sq. ft.	34		Corkb'd
⅛ H. P.	9 lbs.	25	Lacq.	460 lbs.
9 cu. ft.	72	61⅞	Enam.	$295
9	12 sq. ft.	36¾		Corkb'd
⅛ H. P.	9 lbs.	25	Lacq.	500 lbs.
10 cu. ft.	72	64⅜	Enam.	$345

Dunning Pump & Manufacturing Company, (See Kulair Corp.).

E. I. DuPont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J.
Manufacturers of chemicals, paint, DUPONT DUCO and varnish, finishing materials.

Dry-Zero Corporation, 130 North Wells St., Chicago, Ill.
Manufacturers of DRY ZERO pliable and blanket insulation.
Harvey B. Lindsay, pres. and gen. mgr.; F. S. Young, vice-pres.; E. T. Munson, secy.-treas.; J. J. Hagan, asst. secy.; D. E. Baum, asst. treas.; Gale T. Pearce, eng. in charge of sales; and A. L. Clements, fact. supt.

D. A. Ebinger Sanitary Mfg. Co., 180 Lucas St., Columbus, O.
Manufacturers of EBCO water coolers.
D. A. Ebinger, pres.; D. H. Ebinger, vice-pres. and gen. mgr.; H. H. Luekart, secy.; D. A. Ebinger, treas.; H. H. Leukart, sales mgr.; A. E. Smith, refrigeration dept. sales mgr.; J. A. Tharpe, pur. agt.

** ELECTRICAL TESTING **

Electrical Testing Laboratories, 80th St. and East End Ave., New York, N. Y.
Test reports and data on overall performance or on electrical, mechanical or chemical equipment; reports and data are client's property.
John W. Lieb, pres.; C. H. Sharp, Ph.D., vice-pres. and technical director; Preston S. Millar, gen. mgr.; F. Malcolm Farmer, M.E., chief eng.

Electric Refrigeration Corp. (See Kelvinator, Inc.).

** ELECTRO-KOLD **

Electro-Kold Corp., 151 S. Post St., Spokane, Wash.
Manufacturers of ELECTRO-KOLD electric refrigeration units for household and commercial use.
L. M. Simpson, pres.; L. J. Kimmel, vice-pres.; E. S. Matthews, secy.-treas. and sales mgr.; H. L. Masterson, adv. mgr.; D. W. Mather, pur. agt.; C. D. Ellis, dist. mgr., E. 607 Stewart St., Seattle, Wash.; Frederick W. Salt, dist. mgr., 1452 Bush St., San Francisco, Calif.; Andrew H. Doolittle, dist. mgr., 726 South Olive St., Los Angeles, Calif.

Specifications

Trade name, ELECTRO-KOLD; Refrigerant, sulphur dioxide; Compressor, reciprocating; Control, pressure; Motor, ¼ to 1 H.P.

Self Contained Units

Model Capacity	Ice Cubes	Width Depth Height	Finish Ext. Int.	Insulation Retail Price
S		26⅝		1½" Corkb'd
6.5 cu.ft.	36	23	Wh. Duco	
		60½	Wh. Enam.	$275
85 P.		34¾		1½" Corkb'd
8.5 cu.ft.	36	21	Porc.	
		67	Porc.	$375
105 P.		34¾		1½" Corkb'd
10.5 cu.ft.	54	21	Porc.	
		67	Porc.	$450

Erie Art Metal Co., Erie, Pa.
Manufacturers of DAN-DEE pressed steel specialties and of mechanical refrigeration cabinets.
W. H. Knobloch, pres. and gen. mgr.; A. F. Schabacker, vice-pres.; E. Bauschard, secy. and treas.

Electric Refrigeration Directory (Cont'd)

Everite Products, Inc., Dayton, Ohio.
Manufacturers of EVERITE compressors and cooling units for domestic and commercial use.
F. C. Geiler, pres.; B. K. Williamson, vice-pres.; J. A. Wortman, secy. and treas.

Specifications

Trade name, EVERITE; Refrigerant, sulphur dioxide; Compressor, reciprocating; Control, pressure.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Const. Ext. Int.	Shp'g. Wt. Insulation F.O.B.
57	8.06 sq.ft.	25⅞	Steel	1½"-2½" Corkb'd.
⅛ H.P.	6 lbs.	22⅜	Lacq.	550 lbs.
5.3 cu.ft.	54	Enam.	61⅛	$245.
79	11.39 sq.ft.	32⅜	Steel	2"-3" Ckbd.
⅛ H.P.	6 lbs.	24⅛	Lacq.	621 lbs.
7 cu.ft.	54	61¾	Vit. Porc.	$311.
912	11.34 sq ft.	32⅜	Steel	2"-3" Cork.
¼ H.P.	8 lbs.	24⅛	Lacq.	757 lbs.
9 cu ft.	72	69	Vit. Porc.	$383.
1216	18.80 sq.ft.	41⅛	Steel	2½"-3" Cd.
¼ H.P.	11 lbs.	25⅝	Lacq.	830 lbs.
12.7 cu.ft.	96	70⅛	Vit. Porc.	$405.
1520	21.70 sq.ft.	50⅝	Steel	2½-3" Cork.
¼ H.P.	11 lbs.	25⅓	Lacq.	1031 lbs.
15.2 cu.ft	96	70⅛	Porc.	$475.
710S	10.34 sq.ft.	36½		2" Cork.
⅛ H.P.	6 lbs.	22¼	Porc.	620 lbs.
7.28 cu.ft.	54	62½	Porc.	$342.50
912S	11.21 sq.ft.	35½		2"-3" Cork.
¼ H.P.	8 lbs.	21⅜	Porc.	725 lbs.
8.92 cu.ft.	72	71⅝	Porc.	$445.
1115S	15 4 sq. ft.	40¼		2"-3" Cork.
¼ H.P.	8 bs.	23¼	Porc.	800 lbs.
10.7 cu.ft.	72	72	Porc.	$548.
1419S	22 sq.ft.	46		2"-3" Cork.
¼ H.P.	11 lbs.	28⅞	Porc.	875 lbs.
13.78 cu.f	96	69⅞	Porc.	$548.

Excelsior Motor Manufacturing & Supply Company, 3701 Cortland St., Chicago.
Manufacturers of EXCELSIOR refrigerating machines for commercial work in one-fourth, one-half, and one-third ton capacities; also of drop-forged valves, fittings and flanges for other refrigerating machines of similar size.
Ignaz Schwinn, pres. and treas.; Frank W. Schwinn, vice-pres. and gen. mgr.; J. M. Grossmith, secy.; M. W. Crawford, refrigeration sales mgr.; D. E. Rutishauser, mgr. service engineering; A. P. Anderson, chief eng.; Wesley G. Paulson, adv. mgr.; J. E. Anderson, pur. agt.

Fairfield Mfg. Co., 82-106 St. John St., Portland, Me. Factories at Portland and Fairfield.
Manufacturers of EVERCOLD household and commercial electric refrigerator cabinets.
Gilbert Oakley, pres.; J. W. Thomas, treas.

** FEDDERS **

Fedders Mfg. Co., Buffalo, N. Y.
Manufacturers of condensers, float valves and evaporators. Brine tanks; freezing units; expansion valves; liquid receivers; filters; strainers; trays and grids.
L. F. Fedders, pres; J. M. Fedders, vice-pres.; C. W. Fedders, vice-pres.; T. C. Fedders, treas.; H. M. Yeager, vice-pres.; H. L. Heitzman, secy.

Federal Asbestos & Cork Insulation Co., 931 30th St., Milwaukee, Wis.
Manufacturers of FEDERAL cabinets for household and commercial electric refrigerators.
Charles Dieringer, pres.

Federal Gauge Co., 564 W. Adams St., Chicago, Ill.
Manufacturers of MERCOID controls and thermostats.
L. H. Van Ness, pres.; J. W. Owens, vice-pres., Chicago office; N. J. Allaben, vice-pres., New York office; M. Howard, vice-pres., San Francisco office; W. C. Capen, vice-pres., St. Louis office; E. J. Holland, secretary; F. W. Peterson, treas.

** FERN-GLOVER **

Fern-Glover Refrigerator Corp., Linwood Rd. & Pennsylvania R. R., Cincinnati, Ohio.
Manufacturers of LIFE LONG cabinets. B. L. Fern, pres.; Gilbert Glover, vice-pres. and treas.; Andrew Engelhardt, secy.; B. L. Fern, chief engr.; Gilbert Glover, gen. supt.; Andrew Engelhardt, office mgr.; George Clover, works supt.

Cabinet Specifications

Trade name—**LIFE LONG;** Insulation—cork or celotex.

Model Capacity	Width	Depth	Height	Exterior Interior
57 5 cu. ft.	22	25	61	Lacq. Enam.
57 5 cu. ft.	22	25	61	Lacq. Porc.
79 7 cu. ft.	31½	25	62	Lacq. or Porc. Porc.
912 9 cu. ft.	32	25	69	Lacq. or Porc. Porc.
1215 12 cu. ft.	42	25	70	Lacq. or Porc. Porc.
1520 15 cu. ft.	50	25	70	Lacq. or Porc. Porc.

** FERRO ENAMEL **

The Ferro Enamel Supply Co., 2100 Keith Building, Cleveland, Ohio.
Manufacturers of porcelain enamels for refrigerator linings and complete parts. Designers and builders of all types of muffle furnaces and other equipment for porcelain enameling refrigerator linings and parts.
R. A. Weaver, pres.; H. E. Ebright, vice-pres.; D. J. Needham, secy., and H. L. Brooks, treas.

Fidelity Electric Co., 331 N. Arch St., Lancaster, Pa.
Manufacturers of FIDELITY motors for household and commercial electric refrigeration.
Chas. F. Stauffer, pres.; B. Grant Stauffer, treas. and gen. mgr.; Dr. Levi W. Horting, elec. engr.; Chas. P. Banshof, elec. engr.

** FLINTLOCK **

Flintlock Corp., 4461 Jefferson Ave. W., Detroit, Mich.
Manufacturers of FLINTLOCK condensers and expanders.
C. H. L. Flintermann, pres.; John Karmazin, vice-pres.; Elis L. Larson, gen. mgr.; H. I. Phillips, sales engr.; J. E. Seiter, sales engr.; M. J. Copeland, pur. agt.; J. H. Benson, engr.; E. S. Erickson, fact. mgr.

Fowler Refrigerating Machine Co., Baltimore, Md.
Manufacturers of the FOWLER commercial and ice cream and soda fountain electric refrigerators.
Fleming B. Fowler, chairman of the board; Elbert Fowler, vice-pres. and chief engr.; Herbert Schaeffer, secy. and treas.

** FRICK **

Frick Company, Waynesboro, Pa.
Manufacturers of commercial electric refrigeration machinery.
A. O. Frick, chairman of the board; Ezra Frick, pres and gen. mgr.; J. G. Benedict, vice-pres.; D. N. Benedict, treas. and asst. gen. mgr.; M. E. Gordon, asst. treas.; W. R. Snively, secy.; G. H. Kuhn, asst. secy.

The Frigair Company, 1972-1976 Lincoln Ave., Pasadena, Calif. Factories at Los Angeles, and Inglewood, Calif.
Manufacturer of FRIGAIR household and commercial machines and machines for ice cream and soda fountains, water coolers and thermostats.
W. F. Warner, pres., gen. mgr., sales promotion mgr.; T. W. Warner, vice-pres.; M. L. Warner, secy. and pur. agt.; N. F. Hill, fact. mgr.; D. M. Warner, chief engr.

Frigidaire Corp., Dayton, Ohio. Subsidiary of General Motors Corporation.
Manufacturers of household and commercial electric refrigerators, ice cream cabinets and water coolers.
E. G. Biechler, pres.; R. D. Funkhouser, vice-pres.; C. F. Kettering, vice-pres.; H. W. Prior, gen. sales mgr.; J. A. Harlan, household sales mgr.; C. A. Copp, commercial sales mgr.; E. D. Doty, adv. mgr.; L. S. Keilholtz, chief engr.; Thos. B. Fordham, works mgr.

Garland Refrigerator Co., Inc., 101 Park Ave., New York, N. Y. Factory at Mt. Vernon, N. Y.
Manufacturers of GARLAND commercial electric refrigerator cabinets.
M. L. Garland, pres.; B. F. Garland, treas.; C. F. Garland, secy.

** GENERAL ELECTRIC **

General Electric Co., Electric Refrigeration Dept., Hanna Bldg., 1400 Euclid Ave., Cleveland, Ohio. Factories at Schenectady, N. Y., and Fort Wayne, Ind.
Manufacturers of GENERAL ELECTRIC household electric refrigerators; motors for household and commercial machines.
T. K. Quinn, mgr.; P. B. Zimmerman, sales mgr.; C. E. Eveleth, works mgr.; Walter Cowl, Fort Wayne works mgr.; L. R. Edwards, adv. mgr.; W. C. Noll, mgr. of adjustments and claims; A. C. Mayer, mgr. merchandising service; J. J. Kehoe, mgr. cabinets; W. J. Daily, mgr. sales promotion; G. C. Wasson, mgr. warehouse and distribution; C. G. Smith, mgr. credit and collections; H. P. Smith, auditor; W. H. Timmerman, commercial engr.; H. H. Bosworth, mgr. central station division; C. E. Roesch, asst. to sales mgr.; H. C. Mealey, asst. to the mgr.

Specifications

Trade name, GENERAL ELECTRIC; Refrigerant, sulphur dioxide; Compressor, oscillating; Control, pressure; Hermetically sealed.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Finish Exterior Interior	Net Weight Price
S-3-2	5 sq.ft.		339
⅛ H.P. 2.5 cu.ft.		Lacq. Wh. Enam.	$245 f.o.b.
S-5-2	9 sq.ft.		394
⅛ H.P. 5.5 cu.ft.	7 lbs. 56	Lacq. Wh. Enam.	$245 f.o.b.
R-52	9 sq.ft.		536
⅛ H.P. 5.5 cu.ft.	7 lbs. 56	Lacq. Wh. Porc.	$295 f.o.b.
P-5-2	9 sq.ft.		450
⅛ H.P. 5.5 cu.ft.	7 lbs. 56	Porc. Porc.	$330 f.o.b.
R-7-2	12 sq.ft.		625
⅛ H.P. 7.5 cu.ft.	7 lbs. 56	Lacq. Porc.	$365 f.o.b.
R-9-3	17 sq.ft.		535
⅛ H.P. 7.5 cu.ft.	7 lbs. 56	Porc.	$410 f.o.b. 675
P-7-2	12 sq.ft.	Porc.	
⅛ H.P. 9.5 cu.ft.	14 lbs. 112	Lacq. Porc.	
P-9 3	17 sq.ft.		598
⅛ H.P. 9.5 cu.ft.	14 lbs. 112	Porc. Porc.	$520 f.o.b.
P-12-3	20 sq.ft.		666
⅛ H.P. 12 cu.ft.	14 lbs. 112	Porc. Porc.	$570 f.o.b.
P-16 3	24 sq.ft.		775
⅛ H.P. 16 cu.ft.	14 lbs. 112	Porc. Porc.	$640 f.o.b.

** GENERAL NECESSITIES **

General Necessities Corp., 1560-78 Theodore St., Detroit, Mich.
Manufacturers of ABSOPURE FRIGERATORS for household, commercial, ice cream and soda fountain use; water coolers.
David A. Brown, pres.; E. E. Von Rosen, secy. and treas.; E. A. Wentworth, adv.; H. C. Hayes, chief engr.; H. D. Dargert, fact. mgr.; T. S. Pendergast, asst. engr. and service manager.

Specifications

Trade name—**ABSOPURE;** Refrigerant—methyl chloride; Compressor—reciprocating; Control—thermostat.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Const. Ext. Int.	Insulation Net Wt. Price
M-5	9.75 sq. ft.	28¼	Steel	Corkb'd.
¼ H. P.	4.5 lbs.	20⅜	Lacq.	345 lbs.
5.8 cu. ft.	36	60	Lacq.	$210 f.o.b.
M-7	9.75 sq. ft.	32¼	Steel	Corkb'd.
¼ H. P.	6.75 lbs.	23⅛	Lacq.	435 lbs.
7.2 cu. f..	54	58⅛	Lacq.	$310 f.o.b.
M-7-D	5 sq. ft.	32¼	Steel	Corkb'd.
¼ H. P.	6.75 lbs.	23⅛	Lacq.	465 lbs.
7.2 cu. ft.	54	58⅛	Lacq.	$335 f.o.b.
M-7-P	7.5 sq. ft.	32¼	Steel	Corkb'd
¼ H. P.		23⅛	Lacq.	445 lbs.
7.2 cu. ft.	54	58⅛	Porc.	$350 f.o.b.
M-9	10.5 sq. ft.	36⅛	Steel	Corkb'd.
¼ H. P.	6.75 lbs.	23⅛	Lacq.	570 lbs.
9.1 cu. ft.	54	58⅛	Lacq.	$360 f.o.b.
M-9D	6.5 sq. ft.	36⅛	Steel	Corkb'd.
¼ H. P.	6.75 lbs.	23⅛	Lacq.	500 lbs.
9.1 cu. ft.	54	58⅛	Lacq.	$395 f.o.b.
M-9-P	10.5 sq. ft.	36⅛	Steel	Corkb'd
¼ H. P.		23⅛	Lacq.	480 lbs.
9.1 cu. ft.	54	58⅛	Porc.	$395 f.o.b.
M-12	15 sq. ft.	36⅛	Steel	Corkb'd.
¼ H. P.	9 lbs.	23⅛	Lacq.	505 lbs.
12.36 cu. ft.	72	69⅛	Lacq.	$400 f.o.b.
M-120	10.75 sq. ft.	36⅛	Steel	Corkb'd.
¼ H. P.	9 lbs.	23⅛	Lacq.	535 lbs.
12.36 cu. ft.	72	69⅛	Lacq.	$440 f.o.b.
M-12-P	15 sq. ft.	36⅛	Steel	Corkb'd
¼ H. P.		33⅛	Lacq.	515 lbs.
12.36 cu. ft.	72	69⅛	Porc.	$455 f.o.b

Remote Installations

Model	Motor	Capacity	Ice	Cube	Price
08	¼ H. P.	0-8 cu. ft.	4.5 lbs.	36	$170 f.o.b.
812	¼ H. P.	8-12 cu. ft.	6.75 lbs.	54	$210 f.o.b.
1218	¼ H. P.	12-18 cu. ft.	9 lbs.	72	$225 f.o.b.
1825	¼ H. P.	18-25 cu. ft.	9 lbs.	72	$245 f.o.b.
2535	¼ H. P.	25-35 cu. ft.	11.25 lbs.	90	$260 f.o.b

General Refrigeration Co., Beloit, Wis. Factory at South Beloit, Ill.
Manufacturers of LIPMAN automatic electric refrigerating machines for commercial applications; coils; conductors; expansion valves.
T. E. Swords, pres; J. R. Morash, vice-pres. and gen. mgr.; J. J. Tyndal, secy.; George O. Forbes, treas.; C. A. Pearson, sales mgr.; W. C. Moore, adv. mgr.; J. E. Churm, pur-agt.; F. E. Dennison, chief engr.

Specifications

Trade name—**LIPMAN;** Refrigerant—ammonia; Compressor—reciprocating; Control—thermostat.

Remote Installations

Model	Motor	Wdth.	Dpth.	Hght.	Shp. Wt.
50 G	½ H. P.	31¾	19½	23½	580 lbs.
50 Jr.	½ H. P.	24¾	21½	21¾	440 lbs.
75	¾ H. P.	31¾	19½	25½	620 lbs.
100	1 H. P.	39	24	57	1175 lbs.
150	1½ H. P.	39	24	57	1280 lbs.
200	2 H. P.	42	31	58	1829 lbs.
420	5 H. P.	78	29	59	2700 lbs.
710	7½ H. P.	88	31½	53	3600 lbs.
1010	10 H. P.	54⅛	40	60	3600 lbs.
1500-2000		54⅛	40	60	3000 lbs.
3000-4000		60⅜	40	69¼	3500 lbs.

Gibson Refrigerator Company, 515 W. Williams St., Greenville, Mich.
Manufacturers of GIBSON cabinets for household and commercial electric refrigerators.

Gloekler Co., Bernard, 1627-33 Penn Ave., Pittsburgh, Pa.
Manufacturers of GLOEKLER cabinets for household and commercial electric refrigeration, and of commercial display cases.
J. Edward Gloekler, pres. and treas.; Karl J. Gloekler, vice-pres. and secy.; Joseph F. Kriss, pur. agt.; and H. W. Lindsay, chief engr.

Gurney Ball Bearing Company, Jamestown, New York.
Manufacturers of bearings.
Henry K. Smith, pres; A. C. Davis, vice-pres.; J. H. Walters, secy. and treas.; H. A. Johnston, sales mgr.; S. W. Brandel, supt.

The Electric Refrigerator —and Color

By A. D. Carriger, Director of Sales, Wayne Company

We are living in an age of color.

Automobiles changed some time ago from somber black to color combinations that rival the plumage of the birds of the air. Furniture and other furnishings for the home have taken on a gayer hue. Even the humble gas range may be had in practically every conceivable shade. *Color is everywhere!*

Working in close step with the trend of the times, the Wayne Company was quick to recognize the value of color as it might be applied to the electric refrigerator. They set out to put their ideas into practical form and as a result beautiful color effects and combinations have been developed by men skilled in the proper use and application of color.

Shades and color combinations in both conventional, and unusual and bizaare designs, that will fit into and harmonize with any home interior have been developed, so that now milady, regardless of how exacting her preferences or tastes may be, can select a Wayne that will enhance the beauty of her kitchen or any spot where she wants her refrigerator placed.

With this added appeal, the electric refrigerator is now selected by the customer as a beautiful piece of furniture in addition to its recognized value as the only dependable and most economical method for the convenient and proper preservation of foods.

Dealers, too, have recognized the value of color as applied to electric refrigerators as an added sales appeal.

Unusually attractive store and window displays can be easily arranged that are sure to get the attention of the prospective buyer and greatly increase the sales of electric refrigerators.

Electric Refrigeration Directory (Continued)

** GOODNOW & BLAKE **

Goodnow & Blake Mfg. Co., 3840 Beaver St., Detroit, Mich.
Manufacturers of thermostats, suction controls, high pressure cut-outs and other control devices; shaft seals and floats.
Geo. J. Korte, pres.; A. F. Korte, vice-pres.; E. B. Goodnow, secy. and treas.; Manuel Lassen, consulting engr.

John J. Grothe Co., Inc., 5-7 Conn Ave., Zero Bldg., Woburn, Mass.
Manufacturers of ZERO cabinets for electric refrigerators for commercial and ice cream and soda fountain use; water coolers; mechanical refrigerated truck bodies.
James A. Houston, pres.; Arthur B. Mackay, vice-pres.; John E. Burke, secy. and treas.; A. B. Mackay, gen. mgr.; Joseph Robbins, fact. and service mgr.

Gurney Refrigerator Co., Fond du Lac, Wis.
Manufacturers of cabinets for household and commercial electric refrigerators; also of cabinets for ice cream and soda fountain use.
E. G. Vail, pres. and treas.; A. D. Thomsen, vice-pres.; F. A. Foster, secy.; Nicholas Welling, chief engr.; and C. M. Nelson, gen. supt.

Specifications

Model Capacity Shelves	Width Depth Height	Finish Ext. Int.	Insulation Net Wgt.
2601 8 cu. ft. 6.64 sq. ft.	33¾ 19½ 49	Porc. Porc.	Cork 300 lbs.
F-25 20 sq. ft.	44 27 72½	Enam. Enam.	3" Corkb'd 735 lbs.

Harder Refrigerator Corp., Cobleskill, N. Y.
Manufacturers of KLEEN-KOLD electric refrigerator cabinets.
E. S. Ryder, pres.; F. H. Ryder, vice-pres. and gen. mgr.; G. D. Ryder, secy.-treas. and adv. mgr.; H. L. Merrill, sales mgr.; E. C. Allen, pur. agt.; A. W. Rowley, chief engr.; G. J. Hopkins, works mgr.

Hart & Burmeister, Jerrold at Napoleon, San Francisco, Cal.
Manufacturers of **CALIFORNIA** domestic electric refrigerators.

Specifications

Refrigerant—sulphur dioxide; Compressor—reciprocating; Control—thermostat.
Model 4—W. H. P. motor, capacity, 5.6 cu. ft.; shelves, 6 sq. ft.; ice, 4 lbs., 30 cubes; width, 25"; depth, 20½"; height, 56"; finish, exterior, wood with white duco; interior porcelain; insulation, 2" corkboard; weight, 300 lbs.; price F. O. B. $190.

Haskelite Manufacturing Corp., 133 W. Washington St., Suite 819, Chicago, Ill. Factory at Grand Rapids, Mich.
Manufacturers of PLYMETL AIR-TIGHT household and commercial cabinets.
George R. Meyercord, pres.; James R. Fitzpatrick, secy.; Olin H. Basquin, chief engr.; Frank M. Curran, fact. mgr.

Heintz Manufacturing Co., Front and Olney Sts., Philadelphia, Pa.
Manufacturers of STEEL PREST household and commercial electric refrigeration cabinets and steel stampings.
L. I. Heintz, pres.; R. P. Farrington, vice-pres. and treas.; F. W. Thacher, vice-pres.; A. L. Lambert, secy.; W. J. Bryan, sales mgr.; J. J. Fiechter, works mgr.; W. C. DeMaris, office mgr.

** GRAND RAPIDS BRASS **

Grand Rapids Brass Co., 66-90 Scribner Ave., N. W., Grand Rapids, Michigan.
Manufacturers of refrigerator hardware, special pressed work in brass and steel, screw machine products.
J. L. Murray, pres. and gen. mgr.; H. M. Bertelson, vice-pres.; Carlton Austin, secy. and treas

** HALE & KILBURN **

Hale & Kilburn Co., 1800 Lehigh Ave., Philadelphia, Pa.
Manufacturers of ice cream cabinets, water coolers, and steel stampings of all kinds.
J. K. Hoffman, mgr., elect. refrig. dept.

** HERRICK REFRIGERATOR **

Herrick Refrigerator & Cold Storage Co., Commercial Street, Waterloo, Iowa.
Manufacturers of HERRICK household and commercial refrigerators, cabinets for electric refrigeration and water cooling refrigerators.
Nathan Northey, pres.; Edward N. Northey, vice-pres.; H. G. Northey, secy.; W. E. Ogle, treas.; C. A. LaBarre, fact. supt.

The Hibbard Company, 6504 Euclid Ave., Cleveland, Ohio. Factory at Parma, Ohio.
Manufacturers of electrically refrigerated beverage cabinets.
H. W. Hibbard, pres.; I. B. Hibbard, secy.

The Home Products Corp., Jackson, Michigan.
Manufacturers of WHITE FROST and CASTLE household electric refrigerator cabinets.
George H. Hannum, pres.; H. C. Castle, vice-pres.; C. B. Castle, secy.-treas. and gen. mgr.; H. A. Matthews, sales mgr.; G. A. Christman, pur. agt.

** HVID **

The Hvid Ice Machine Corp., First National Bank Bldg., Chicago, Ill.
Manufacturers of SNOW QUEEN electric refrigerating machines.
Lawrence E. Abt, pres.; R. M. Hvid, vice-pres.

Iron Mountain Co., 939-1011 E. 95th St., Chicago, Ill.
Manufacturers of ZEROZONE commercial and household electric refrigerators, electric refrigeration units for ice cream, soda fountains, water coolers and other special appliances.
C. E. Jernberg, pres. and gen. mgr.; O. H. Anderson, vice-pres. and treas.; L. C. Keely, vice-pres. in charge of sales; E. R. Lovegren, asst. sales mgr.; A. C. Moreland, sales promotion mgr.; S. G. Hawley, pur. agt.; W. E. Bihl, chief engr.; R. F. Polley, service mgr.

Specifications

Trade name—ZEROZONE; Refrigerant—sulphur dioxide; compressor—reciprocating; Control—thermostat; V belt drive; Brine tank.

Self Contained Units

Model Capacity	Trays Cubes	Width Depth Height	Finish Ext. Int.	Insulation
LE-49 7½ sq. ft.	2 42	26 22 49	Duco Enam.	Corkb'd.
LP-49—same as **LE-49**, with porcelain interior.				
LE-56 9.64 sq. ft. 5.2 cu. ft.		26 21 56	Lacq. Enam.	Corkb'd.
LP-56—same as **LE-56**, with porcelain interior.				
LP-5 9.16 sq. ft. 5.1 cu. ft.	2 42	31½ 20 58½	Lacq. Porc.	Corkb'd.
P-5—same as **LP-5**, with porcelain exterior.				
LP-7 11 sq. ft. 7 cu. ft.	3 63	35¼ 22 63½	Lacq. Porc.	Corkb'd.
P-7—same as **LP-7**, with porcelain exterior.				
LP-9 12.8 sq. ft. 9 cu. ft.	3 63	35½ 22 70½	Lacq. Porc.	Corkb'd.
P-9—same as **LP-9**, with porcelain interior.				
P-15 15.4 sq. ft. 10.7 cu. ft.	105	40¼ 23¼ 72	Porc. Porc.	Corkb'd.
P-21 22.08 sq. ft. 16.69 cu. ft.	105	55¼ 23¼ 69⅛	Porc. Porc.	Corkb'd.

Compressor Specifications

Model S-C—¼ H. P., V belt drive; Max. capacity 20 cu. ft., Reciprocating type; Condenser—air cooled; Control—thermostat.

Model T-C— ⅛H. P.; V belt drive; Max. capacity 50 cu. ft., Reciprocating type; Condenser—air cooled; Control—thermostat.

Illinois Refrigerator Co., Morrison, Ill.
Manufacturers of household and commercial electric refrigerator cabinets.
Edward A. Smith, pres.; F. L. Smith, vice-pres. and gen. mgr.; Harry L. Kirberg, treas.; Humphrey C. Rendall, secy.; Arthur T. Freer, sales mgr.; Alfred W. Collins, traffic mgr.

** INCO MONEL **

The International Nickel Co., Inc., 67 Wall St., New York, N. Y. Factories located at Huntington, W. Va.
Manufacturers of INCO Monel Metal sheet, strip, rod, castings, screws, bolts, rivets, etc.
R. C. Stanley, pres.; J. F. McNamara, sales mgr. Monel Metal and Rolled Nickel Department.

The Iroquois Electric Refrigeration Co., 1500 Arch St., Philadelphia, Pa. Associate of the Barber Asphalt Co. Factory at Buffalo, N. Y.
Manufacturers of IROQUOIS household electric refrigerators.
Arthur W. Sewall, pres.; Frank Seamans and C. W. Bayliss, vice-pres.; E. R. Riter, secy.; Ira Atkinson, treas.; C. W. Bayliss, sales mgr.; W. F. Hartzell, adv. mgr.; F. A. Browne, chief engr.; A. L. Bell, works mgr.

Specifications

Trade name—IROQUOIS; Refrigerant—ethyl chloride; Compressor—rotary; Control—pressure; V belt drive; Direct expansion.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Finish Ext. Int.	Insulation Shipping Weight
101 ⅛ H.P. 7.2 cu.ft.	9.5 sq.ft. 9.3 lbs. 110	26¼ 61 22½	Wh. Enam. Wh. Enam.	1½"-2½" Ckbd. 435 lbs.
72 ¼ H.P. 8 cu. ft.	7 sq.ft. 4 lbs. 48	36½ 21 47	Porc. Porc.	1½"-2½" Ckbd. 407 lbs.
73 ¼ H.P. 9.9 cu.ft.	8 sq.ft. 4 lbs. 48	39½ 21½ 50	Porc. Porc.	1½"-2½" Ckbd. 461 lbs.
73½ ¼ H.P. 16.6 cu.ft.	15 sq. ft. 9 lbs. 96	39½ 24 66½	Porc. Porc.	1½"-2½" Ckbd. 624 lbs.
75 ¼ H.P. 20.2 cu.ft.	18.5 sq.ft. 13 lbs. 144	47½ 24¼ 66½	Porc. Porc.	1½"-2½" Ckbd. 711 lbs.
60 ¼ H.P. 8 cu.ft.	7 sq.ft. 4 lbs. 48	37 21½ 64¼	Porc. Porc.	1½"-2½" Ckbd. 540 lbs.
62 ¼ H.P. 7.6 cu.ft.	6.5 sq.ft. 4 lbs. 48	35½ 20 47	Gray Porc. Wh. Porc.	1½"-2½" Ckbd. 347 lbs.
63 ¼ H.P. 9.7 cu.ft.	8 sq.ft. 4 lbs. 48	37 21½ 50	Gray Porc. Wh. Porc.	1½"-2½" Ckbd. 386 lbs.
63¾ ¼ H.P. 14 cu.ft.	17.5 sq.ft. 9 lbs. 96	40 23 56	Gray Porc. Wh. Porc.	1½"-2½" Ckbd. 470 lbs.
65 ¼ H.P. 19.6 cu.ft.	15.5 sq.ft. 13 lbs. 144	45½ 23 66	Gray Porc. Wh. Porc.	1½"-2½" Ckbd. 594 lbs.

Jack Frost Ice Machine Co., Ltd., 347 Sorauren Ave., Toronto, Canada.
Manufacturers of JACK FROST household and commercial refrigerators, complete units for ice cream and soda fountain use, water coolers, soft drink cabinets.
John G. O'Brien, pres.; F. Mayhew, vice-pres.; G. Argument, secy. and treas.; John C. O'Brien, general mgr.; Fred C. Baker, mgr. of sales; T. L. O'Brien, gen. supt.; W. Thornton, asst. supt. in charge of installation and service.

Jewett Refrigerator Co., 2 Letchworth St., Buffalo, N. Y. Factories at Buffalo, Lackawanna, Bridgeburg, Can.
Manufacturers of JEWETT cabinets for household and commercial electric refrigerators; JEWETT square water coolers and ice makers.
Edgar B. Jewett, pres. and treas.; H. J. Hedrick, vice-pres. in charge of Chicago office; Arthur M. Nelson, vice-pres. in charge of New York office; Fulton Brown, in charge of Boston office; C. F. Gerhardt, secy.; B. A. Simon, pur. agt.

J. T. Manufacturing Co., 666 Lake Shore Drive, Chicago, Ill. Factory at Nashville, Tenn.
Manufacturers of cabinets for household electric refrigerators.
A. C. Jones, pres.; Jacob Teller, vice-pres. and sales manager; L. E. Stephens, secy.-treas. and sales mgr.; L. E. Stephens, secy.-treas.

Kelvinator, Inc., Plymouth Road, Detroit, Michigan. Subsidiary of Electric Refrigeration Corp. Facories at Detroit and Grand Rapids, Mich.
Distributors of KELVINATOR electric refrigerators for household and commercial use, NIZER ice cream and soda fountain units and cabinets, LEONARD refrigerator cabinets.
A. H. Goss, chairman of board, (Electric Refrigerator Corp.); C. K. Woodbridge, pres.; H. W. Burritt, B. A. MacDonald, W. D. Mercer, A. W. Berresford, H. C. Leonard, and H. A. Lewis, vice-presidents; M. Wiley, secy.; C. K. Matheson, director of sales, Kelvinator division; H. A. Sieck, director of sales, Nizer division; August H. Jaeger, sales mgr., Leonard division; A. A. Morell, pur. agt.; C. C. Spreen, chief eng.; E. A. Seibert, service mgr.

Specifications

Trade name, KELVINATOR; Refrigerant, sulphur dioxide; Compressor, reciprocating; Control, thermostat; V belt drive; brine tank.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Const. Ext. Int.	Insulation Installed Price
272 ⅛ H.P. 4.7 cu.ft.	7 sq.ft. 4 lbs. 30	26½ 22½ 56⅛	Steel Gray Lacq. Wh. Enam.	2" Corkb'd $210
273 ⅛ H.P. 4.7 cu.ft.	7 sq.ft. 4 lbs. 30	26½ 22½ 56⅛	Steel Wh. Lacq. Porc.	2" Corkb'd $235
293 ⅛ H.P. 6.2 cu.ft.	9.33 sq.ft 6 lbs. 45	34⅛ 22½ 56⅛	Steel Wh. Lacq. Porc.	2" Corkb'd $310
229 ¼ H.P. 5.25 cu.ft.	9.5 sq.ft. 6 lbs. 42	27¼ 26⅛ 60½	Steel Porc. Porc.	1½" Corkb'd $330
231 ¼ H.P. 9 cu.ft.	11.6 sq.ft. 12 lbs. 84	40¼ 26⅛ 67¼	Wood Wh. Lacq. Porc.	2" Corkb'd $465
232 ¼ H.P. 9 cut.ft.	11.6 sq.ft 12 lbs. 84	40¼ 26⅛ 67¼	Wood Oak Porc.	2" Corkb'd $465
232 ¼ H.P. 9 cu.ft.	11.6 sq.ft. 12 lbs. 84	41 26½ 67⅜	Porc. Porc.	2" Corkb'd $535

Remote Installations

Model	Motor	Capacity	Ice Cubes	Price Inst'd
O-8 N.V.	⅛ H.P.	0-8 cu.ft.	4 lbs. 30	$195
O-8 W.V.	⅛ H.P.	0-8 cu.ft.	4 lbs. 30	$195
O-8 H.	⅛ H.P.	0-8 cu.ft.	4 lbs. 30	$195
O-10 V.	¼ H.P.	0-10 cu.ft.	9 lbs. 63	$250
O-10 H.	¼ H.P.	0-10 cu.ft.	9 lbs. 63	$250
1015 V.	¼ H.P.	10-15 cu.ft.	9 lbs. 63	$265
1015 H.	¼ H.P.	10-15 cu.ft.	9 lbs. 63	$265
1520 J.V.	¼ H.P.	15-20 cu.ft.	9 lbs. 63	$275
1520 H.	¼ H.P.	15-20 cu.ft.	9 lbs. 63	$275
1520 S.V.	¼ H.P.	15-20 cu.ft.	15¼ lbs.	$310
2030 N.V.	¼ H.P.	20-30 cu.ft.	15¼ lbs.	$320
2030 W.V.	¼ H.P.	20-30 cu.ft.	15¼ lbs.	$320
2030 H.	¼ H.P.	20-30 cu.ft.	15¼ lbs.	$320
3040 N.V.	¼ H.P.	30-40 cu.ft.	18¼ lbs.	$340
3040 W.V.	¼ H.P.	30-40 cu.ft.	18¼ lbs.	$340
3040 H.	¼ H.P.	30-40 cu.ft.	18¼ lbs.	$340
4050 N.V.	¼ H.P.	40-50 cu.ft.	21¼ lbs.	$360
4050 W.V.	¼ H.P.	40-50 cu.ft.	21¼ lbs.	$360
4050 H.	¼ H.P.	40-50 cu.ft.	21¼ lbs.	$360

** KEOKUK **

Keokuk Refrigerating Co., Keokuk, Ia.
Manufacturers of KEOKUK household and Commercial electric refrigerators, thermostats; other control devices.
G. E. Weissenburger, pres. and gen. mgr.; John Dillon, vice-pres.; J. O. Boyd, secy. and treas.; John Dillon, sales and adv. mgr.; Geo. M. Berryhill, pur. agt.; G. L. Weissenburger, chief eng. and asst. sales mgr.

Specifications

Trade name, KEOKUK; Refrigerant, sulphur dioxide; Compressor, reciprocating; Control, thermostat; spiral gear drive.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Const. Ext. Int.	Insulation F.O.B. Price
103 ⅛ H.P. 5.1 cu.ft.	8.7 sq.ft. 4.5 lbs. 36	26¼ 22 57	Steel Wh.Lc. Porc.	2" Min. Wool $225
57 ⅛ H.P. 5.3 cu.ft.	8.06 sq.ft. 4.5 lbs. 36	25⅞ 22½ 61½	Steel Wh.Lc. Porc.	1½"-2½" Ckb. $250
DeLuxe 5.7 cu.ft. ¼ H.P.	8.5 sq.ft. 4.5 lbs. 36	30 24½ 62½	Steel Wh.Lc. Porc.	2" Felt & Pape $265
79 ¼ H.P. 7 cu.ft.	11.4 sq.ft. 6.75 lbs. 54	32 24¾ 61¾	Steel Wh.Lc. Porc.	2"-3" Corkb'd. $360
912 ¼ H.P. 9 cu.ft.	13.4 sq.ft. 11.25 lbs. 90	32⅜ 24¾ 69	Steel Wh.Lc. Porc.	2"-3" Corkb'd. $360
1216 ¼ H.P. 12.7 cu.ft	18.8 sq.ft. 13.5 lbs. 108	42⅛ 26 70⅛	Steel Wh.Lc. Porc.	2½"-3" Ckbd. $485
1520 ¼ H.P. 15.2 cu.ft	21.7 sq.ft. 13.5 lbs. 108	50⅝ 26 70⅛	Steel Wh.Lc. Porc.	2½"-3" Ckbd. $525

Remote Installations

Model	Motor	Capacity	Ice Cubes	F.O.B. Price
FC-8	⅛ H.P.	8 cu.ft.	4.5 lbs. 36	$170
DC-14	¼ H.P.	13 cu.ft.	11.25 lbs. 90	$230
DC-12	¼ H.P.	12 cu.ft.	10.5 lbs. 84	$215
DC-10	¼ H.P.	10 cu.ft.	6.75 lbs. 54	$200
E-20	¼ H.P.	20 cu.ft.	13.5 lbs. 108	$265
E-30	¼ H.P.	30 cu.ft.	15.75 lbs. 126	$285
E-40	¼ H.P.	40 cu.ft.	15.75 lbs. 126	$295
H-55	½ H.P.	60 cu.ft.	15.75 lbs. 126	$350

** KEROTEST **

Kerotest Manufacturing Co., 2525 Liberty Ave., Pittsburgh, Pa.
Manufacturers of forged brass cylinder and shut-off valves and fittings.
Edward G. Mueller, pres.; R. W. Mueller, vice-pres.; W. G. Swaney, secy.; and John S. Forbes, treas.

Keystone Refrigeration Corp., Beaver Falls, Pa.
Manufacturers of KEYSTONE commercial refrigerator units.
W. B. Atwood, pres. and gen. mgr.; J. Blair Easter, vice-pres. in charge of sales; G. W. Kilpatrick, secy. and treas.; D. W. Campbell, asst. secy. and asst. treas.; J. W. Campbell, sales eng.; H. S. Michael, chief eng.; C. O. Duevel, research eng.

** KULAIR **

Kulair Corp., Norristown, Pa. (Successors to Dunning Pump & Mfg. Co.).
Manufacturers of condensers and expanders, and thermostats.
Phillips F. Lee, pres.; W. W. Moss, vice-pres. and treas.; Frank C. Brady, secy.; G. W. Gail, eng.

La Crosse Refrigerator Corp., La Cross, Wis.
Manufacturers of LORRAINE cabinets.

** LAMSON **

The Lamson Co., subsidiary of American Pneumatic Service Co., Syracuse, New York.
Manufacturers of ICE MAID household, ice cream and soda fountain machines.
Merton L. Emerson, pres. and gen. mgr.; John S. Ogg, vice-pres. and treas.; H. W. Alexander, gen. mgr. Ice Maid division; J. T. Cowley, chief eng.; H. F. Brugmann, fact. supt.; and S. W. Pierce, pur. agt.

Specifications

Trade name, ICE MAID; Refrigerant, ethyl chloride; Compressor, rotary; Control, thermostat; direct drive; brine tank.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Finish Ext. Int.	Shpg. Wt. Price Installed
R-7-E ¼ H.P. 5.4 cu.ft.	8.06 sq.ft. 4 lbs. 36	25⅛ 22 61	Wh. Duco Wh. Enam.	665 lbs. $265
R-7-P ¼ H.P. 5.4 cu.ft.	8.06 sq.ft 4 lbs. 36	25⅞ 22⅞ 61	Wh. Duco Wh. Porc.	665 lbs. $295
R-9 7 cu.ft.	11.39 sq.ft. 7¼ lbs. 72	32⅛ 24½ 61¾	Wh. Duco Wh. Porc.	750 lbs. $385
R-12 9 cu.ft.	13.34 sq.ft. 9.75 lbs. 96	32⅛ 24½ 69	Wh. Duco Wh. Porc.	810 lbs. $465
R-16 12 cu.ft.	18.80 sq.ft. 9.75 lbs. 96	42⅛ 25⅛ 70⅛	Wh. Duco Wh. Porc.	955 lbs. $530
R-20 15 cu.ft.	21.70 sq.ft. 9.75 lbs. 96	50⅝ 25⅝ 70⅛	Wh. Duco Wh. Porc.	1070 lbs. $595

Remote Installations

Model	Capacity	F.O.B. Price
2	0-8 cu.ft.	$230
5	8-10 cu.ft.	$260
10	10-20 cu.ft.	$280
20	20-25 cu.ft.	$325
30	25-35 cu.ft.	$355

Leachwood Co., Janesville, Wis.
Manufacturers of corrugated metal bellows of seamless type, compressor seals, thermostatic controls, pressure controls, high pressure cut outs, expansion valves, float valves, and floats.
P. J. E. Wood, pres.; W. C. Lagerman, vice-pres. and fact. mgr.; E. J. Leach, secy. and treas., chief eng.

Leland Electric Company, Dayton, Ohio.
Manufacturers of motors for domestic and commercial electric refrigerators.
George H. Leland, pres.; E. B. George, sales mgr.; W. E. Kraft, treas.

John Lees, Co., 241 West Georgia St., Indianapolis, Ind.
Manufacturers of refrigerator hardware (angles, trim and corners).
Harry Murphy, pres.; C. R. Shaffer, vice-pres. and sales mgr.; A. F. Westlund, vice-pres. and pur. agt.; W. A. Keller, secy. and treas.

Leonard Refrigerator Company, Grand Rapids, Mich., division of the Electric Refrigeration Corp.
Manufacturers of LEONARD CLEANABLE cabinets for household and commercial use.
H. W. Burritt, pres.; A. H. Jaeger, sales mgr.; C. W. Kirkpatrick, asst. secy.-treas.; Earl Lines, adv. mgr.; A. J. Mitchell, pur. agt.; H. L. Pope, chief eng.

Lindsay, Hyde & Co., 2130 E. York St., Philadelphia, Pa.
Manufacturers of LIHYCO electric refrigerators for household use; tubing.
Wm. Geible, sales mgr.; Wm. J. Maginnis, chief eng.; John Lindsay, works mgr.

Louisville Refrigerator Corporation, 4460 Louisville Ave., Louisville, Ky. Factory located at Highland Park, Ky.
Manufacturers of WHITE SEAL steel clad cabinets for household use and electric refrigerators for multiple hook-up only.
H. S. Milton, pres. and secy.; H. P. Dowling, treas.; Geo. W. Grove, sales mgr.

Electric Refrigeration Directory (Cont'd)

** LUSE-STEVENSON **

Luse-Stevenson Co., 307 N. Michigan Ave., Chicago, Ill.
Manufacturers of RELIABLE corkboard insulation.

L. H. Mace & Co., 55 East 150th St., New York, N. Y.
Manufactures of MACE household electric refrigerator cabinets.
Samuel Steinfeld, pres.; Lew Hutzler, treas.; Wm. Lurie, secy.; Ralph Redell, gen. mgr.

Marathon Electric Mfg. Co., Wausau, Wis.
Manufacturers of MARATHON "OK" motors for electric refrigerators.
J. S. Alexander, pres.; A. P. Woodson, vice-pres.; L. H. Wheeler, treas.; L. H. Wheeler, gen. mgr.; J. W. Kapus, sales and adv. mgr.; W. N. Baldwin, pur. agt.; R. O. Gilburg, supt.

Master Electric Company, Linden and Master Aves., Dayton, O.
Manufacturers of MASTER motors for household and commercial machines.
E. P. Larsh, pres.; W. R. Clements, vice-pres.; J. O. Wortman, secy.; H. E. Kline, treas.

** McCRAY **

McCray Refrigerator Sales Corp., Kendallville, Indiana.
Manufacturers of McCRAY household and commercial electric refrigerator cabinets.
E. E. McCray, pres. and gen. mgr.; H. McCray, vice-pres.; H. M. Stewart, vice-pres. and gen. sales mgr.; J. W. Hart, secy.; R. E. Davis, treas.; R. S. Moses, asst. sales mgr.; R. J. Rehwinkel, publicity mgr.; C. O. Ullen, gen. fact. supt.; R. J. Misselhorn, central sales mgr.; M. A. Drumheller, western sales mgr.; W. R. Hawkins, eastern sales mgr.; V. C. Knight, southern sales mgr.

McCord Radiator & Mfg. Co., East Grand Blvd. and Riopelle St., Detroit, Mich. Factories at Detroit, Plymouth, Ind., and Walkerville, Ont.
Manufacturers of tubing, condensers and expanders, enameling, gaskets, diaphragms, stampings (steel, brass and copper).
A. C. McCord, pres.; C. R. Hammer, vice-pres. and treas.; Morril Dunn, vice-pres. in charge of sales; P. L. Barter, vice-pres. in charge of sales; E. O. Bodkin, adv. mgr.; J. Cooper, pur. agt.; J. Harris, chief eng.; R. M. Hyde, eng.; C. W. Owston, vice-pres. and works mgr.; F. W. Hicks, fact. mgr.

Mechana-Kold Corporation, Bay Shore, New York.
Manufacturers of household refrigerating machines, small commercial machines for display counter use, and complete line of metal cabinets with machines in bases; also thermostats and freezing tanks.

The Merchant & Evans Co., 2035 Washington Ave., Philadelphia, Pa. Factories at Lancaster and Philadelphia, Pa.
Manufacturers of M. & E. household and commercial electric refrigerators.
Powell Evans, pres.; Thomas Evans, secy. and gen. mgr.; M. P. Stoney, production mgr.; S. J. Benn, chief refrigeration eng.

Specifications

Trade Name—M & E; Refrigerant—Sulphur Dioxide; Compressor—Reciprocating; Control—Thermostat.

Self Contained Units

Model Capacity	Ice Cubes	Width Depth Height	Finish Ext. Int.
5-GE		28	
5.5 cu. ft.	36	22	Duco
		60	Duco
5-GP		28	
5.5 cu. ft.	36	22	Porc.
		61	Porc.
5-G		28	
5.5 cu. ft.	36	22	Duco
		61	Porc.
7-G		34	
7 cu. ft.	60	25	Duco
		64	Porc.
9-G		34	
9 cu.ft.	60-84	25	Duco
		70	Porc.
12-G		44	
12 cu. ft.	96	25	Duco
		70	Porc.
16-G		52	
16 cu. ft.	120	26	Duco
		70	Porc.
7-BMPG	30-60	35	
		20	Porc.
		65	Porc.
8-BMPW	48-72	36	
6 cu. ft.		20	Porc.
		65	Porc.
10-BMPW	60-84	39	
8 cu. ft.		24	Porc.
		67	Porc.
12-BMPW	96	43	
9 cu. ft.		24	Porc.
		74	Porc.
16-BMPW	120-144	48	
13 cu. ft.		26	Porc.
		75	Porc.
9-BMPG	60-84	36	
7.5 cu. ft.		22	Porc.
		68	Porc.

Metz Products Corp., 3051 Rosslyn St., Los Angeles, Calif.
Manufacturers of METZ superinsulated cabinets for household electric refrigerators.
Walter Metz, pres.; Edwin H. Metz, secy.-treas.

Michigan Refrigeration Co., Inc., 1600 Monroe Ave., Grand Rapids, Mich.
Manufacturers of EL-FRIG-ETTE household electric refrigerator.
Joseph Renihan, pres.; V. I. Cilley, secy.-treas.; M. D. Greene, production mgr.

** MOTORS METAL **

Motors Metal Manufacturing Co., 5936 Milford Ave., Detroit, Mich.
Manufacturers of ice cream cabinets complete ready for installation in freezing units; unassembled stampings for ice cream cabinets; special cabinets for milk coolers; bottle coolers; metal guards to cover freezing units; angle iron bases on which to mount them; sheet metal panels—inside and outside for household refrigerators.
Robert R. McMath, pres.; George D. Shanahan, gen. mgr.; Nelson C. Johnson, secy. and treas.; Ferris B. Fick, gen. sales mgr.; R. M. Halsted, asst. to gen. sales mgr.; George A. mgr.; Vincent Corrado, chief engr.; R. H. Hall, pur. agt.

Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.
Manufacturers of tubing.
O. B. Mueller, pres. and gen. mgr.; F. L. Riggin, secy. and sales mgr.; R. W. Peden, treas.; Robert Mueller, vice-pres. (Decatur, Ill.); Reuben Levine, adv. mgr.; H. A. McDermott, pur. agt.; C. A. Hill, chief eng.; D. E. Lindquist, supt.

The National Copper & Smelting Co., 12120 Euclid Ave., Cleveland, Ohio. Factory at 1895 Coltman Road, Cleveland.
Manufacturers of brass and copper seamless tubing.
H. L. Smith, pres.; H. F. Taylor, vice-pres.; Homer B. Smith, secy.; C. L. Smith, treas.; H. B. Smith, gen. mgr.; George Staffeld, fact. mgr.

Narragansett Machine Co., Vale St., Pawtucket, R. I.
Manufacturers of CHILRITE electric refrigerators for household use.
A. J. Thornley, pres.; Albert E. Thornley, vice-pres.; C. A. Bryant, adv. mgr.

Specifications

Trade name—CHILRITE: Refrigerant—Sulphur dioxide; Compressor—Rotary gear; Control—Thermostat; Alcohol and water cooling tank.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Finish Ext. Int.	Insulation Net Wt. F.O.B. Price
Ss-522	6.8 cu.ft.	27		2" Bal. Ck.
⅛ H.P.	2.5 lbs.	23	Wh. Enam.	277 lbs.
7.7 cu.ft.	54	61½	Wh. Enam.	$235
Sg-710	10.34 sq.ft.	36½		2" Corkb'd.
⅛ H.P.	7 lbs.	22⅛	Porc.	440 lbs.
10.23 cu.ft.	72	62½	Porc.	$350
Sg-912	11.21 sq.ft.	35½		2"-3" Corkb'd.
¼ H. P.	8.7 lbs.	21⅛	Porc.	470 lbs.
12.10 cu.ft.	90	71⅝	Porc.	$450

Remote Installations

Model	Motor	Capacity	Ice	Cubes	F.O.B. Price
22/647	⅛ H.P.	0-10 cu.ft.	7 lbs.	72	$175
40/651	¼ H.P.	10-35 cu.ft.	10 lbs.	114	$245
75/653	⅓ H.P.	35-60 cu.ft.	14 lbs.	144	$315

National Refrigerating Co., branch of Winchester Repeating Arms Co., 125 Munson St., New Haven, Conn.
Manufacturers of ICE-O-LATOR household and commercial electric (and gas operated) refrigerators.
W. A. Tobler, pres.; L. H. Thompson, vice-pres., treas.; Edwin Pugsley, vice-pres.; F. H. Knapp, vice-pres. and gen. mgr.; Henry Brewer, secy.; A. E. Hodgson, asst. treas.; L. W. Crenshaw, asst. secy.; G. W. Keller, sales mgr.; John A. Lunn, sales eng.; Dr. W. R. Hainsworth, refrigeration eng.; C. S. Hutt, adv. mgr.; George H. Reama, works mgr.

Specifications

Trade name—ICE-O-LATOR; Refrigerant—Ammonia; Absorption type machine.

Self Contained Unit

Model EN-6; Capacity, 8 cu. ft., 7.1 sq. ft., 4 lb. ice, 30 cubes; Exterior—white porc.; Interior—white porc.; Shipping wgt.—513 lbs.; Insulation—2"—3" corkboard.

C. Nelson Manufacturing Co., 2300 Division St., St. Louis, Mo.
Manufacturers of electrically refrigerated ice cream cabinets, water coolers, and beverage cabinets.
Charles Nelson, pres.; W. U. Nelson, vice-pres.; James Nelson, secy.-treas.

F. W. Niebling & Company, 408 Elm St., Cincinnati, Ohio.
Manufacturers of refrigerating machinery, compressors, plate valves for compressors.
F. W. Niebling, pres.

Norge Corp., 670 East Woodbridge St., Detroit, Mich.
Manufacturers of NORGE household electric refrigerator units.
E. E. McCray, chairman of the board; Howard E. Blood, pres. and gen. mgr.; W. C. Rands, vice-pres.; W. C. Rands, Jr., secy.-treas.; R. E. Davis, asst. secy. and treas.; C. D. Donaven, asst. gen. mgr.; A. E. Bottenfield, sales mgr.; R. G. Nelson, chief engr.

Specifications

Trade name—NORGE; Refrigerant—sulphur dioxide; Compressor—rotary; Control—pressure.

Self Contained Units

Models Motor Capacity	Shelves Ice Cubes	Width Depth Height	Const. Ext. Int.	Insulation Net Wgt.
5070-5-7-E	6.08 sq. ft.	23⅞		Corkb'd
¼ H. P.	3 lbs.	22 11/16	Lacq.	246 lbs.
5.3 cu. ft.	30	61 11/16	Enam.	
5070-5-7-P	6.08 sq. ft.	25⅞		Corkb'd
¼ H. P.	3 lbs.	22 5/16	Lacq.	248 lbs.
5.3 cu. ft.	30	61 5/16	Porc.	
5070-B-6	9 sq. ft.	20⅝		Corkb'd
¼ H. P.	3 lbs.	22⅝	Porc.	255 lbs.
5.4 cu. ft.	30	64¾	Porc.	
5100-7-9-R	11.31 sq. ft.	32⅛		Corkb'd
¼ H. P.	8.7 lbs.	24⅛	Lacq.	293 lbs.
7 cu. ft.	84	61¾	Porc.	
5100-B-9	11 sq. ft.	37		Corkb'd
¼ H. P.	8.7 lbs.	22½	Porc.	370 lbs.
7.47 cu. ft.	84	65½	Porc.	
5150-9-12-P	11.3 sq. ft.	32⅜		Corkb'd
¼ H. P.	8.7 lbs.	25	Lacq.	329 lbs.
9 cu. ft.	84	69	Porc.	
5150-B-12	14.7 sq. ft.	40½		Corkb'd
¼ H. P.	8.7 lbs.	22½	Porc.	431 lbs.
10.5 cu. ft.	84	71¼	Porc.	
5150-12-16-P	18.8.sq. ft.	42⅛		Corkb'd
¼ H. P.	8.7 lbs.	25⅝	Lacq.	458 lbs.
12.7 cu. ft.	84	70⅛	Porc.	
5150-B-15	17.1 sq. ft.	40½		Corkb'd
¼ H. P.	8.7 lbs.	25½	Porc.	488 lbs.
13.2 cu. ft.	84	71½	Porc.	
5300-15-20-P	21.7 sq. ft.	50⅝		Corkb'd
¼ H. P.	10.8 lbs.	25⅝	Lacq.	521 lbs.
15.2 cu. ft.	126	70⅛	Porc.	
5300-B-20	24.4 sq. ft.	53		Corkb'd
¼ H. P.	1.8 lbs.	25½	Porc.	613 lbs.
17.7 cu. ft.	126	71½	Porc.	
5100-M-130	7 sq. ft.	36	Steel	Corkb'd
¼ H. P.	8.7 lbs.	22	Lacq.	500 lbs.
5.15 cu. ft.	84	49½	Porc.	
5100-M-140	8.25 sq. ft.	38	Steel	Corkb'd
¼ H. P.	8.7 lbs.	23	Lacq.	550 lbs.
6.4 cu. ft.	84	51¼	Porc.	
5150-M-150	12 sq. ft.	40	Steel	Corkb'd
¼ H. P.	8.7 lbs.	24	Lacq.	650 lbs.
8.15 cu. ft.	84	55½	Porc.	
5150-M-160	15 sq. ft.	43	Steel	Corkb'd
¼ H. P.	8.7 lbs.	26	Lacq.	750 lbs.
11.45 cu. ft.	84	59½	Porc.	
5100-M-350	12 sq. ft.	40	Wood	Corkb'd
¼ H. P.	8.7 lbs.	24	Oak	600 lbs.
8.15 cu. ft.	84	55½	Porc.	
5150-M-360	15 sq. ft.	43	Wood	Cor b'd
¼ H. P.	8.7 lbs.	26	Oak	690 lbs.
11.45 cu. ft.	84	59½	Porc.	
5100-M-330	7 sq. ft.	36	Wood	Corkb'd
¼ H. P.	8.7 lbs.	22	Oak	450 lbs.
5.15 cu. ft.	84	49½	Porc.	
5100-M-340	8.25 sq. ft.	38	Wood	Corkb'd
¼ H. P.	8.7 lbs.	23	Oak	500 lbs.
6.4 cu. ft.	84	51½	Porc.	
5300-M-370	20.7 sq. ft.	48	Wood	Corkb'd
¼ H. P.	10.8 lbs.	26	Oak	880 lbs.
14.7 cu. ft.	126	70½	Porc.	

Remote Installation

Model	Motor	Capacity	Ice	Cubes	Net Wgt.
5050	¼ H. P.	5 cu. ft.	3 lbs.	30	190 lbs.
5055	¼ H. P.	5 cu. ft.	3 lbs.	30	190 lbs.
5070	¼ H. P.	7 cu. ft.	3 lbs.	30	194 lbs.
5100	¼ H. P.	10 cu. ft.	8.7 lbs.	84	207 lbs.
5150	¼ H. P.	15 cu. ft.	8.7 lbs.	84	208 lbs.
5155	¼ H. P.	15 cu. ft.	10.8 lbs.	84	210 lbs.
5300	¼ H. P.	30 cu. ft.	15 lbs.	126	213 lbs.
5450	¼ H. P.	45 cu. ft.	15 lbs.	168	218 lbs.

** NORTHEY **

Northey Manufacturing Co., Park Ave. and Bluff St., Waterloo, Iowa.
Manufacturers of NORTHEY water coolers, cold storage rooms, commercial cooling rooms, chests, fish boxes, refrigerator for every purpose, any style, shape or insulation.
F. L. Northey, pres.; Hugh McCartney, gen. sales mgr.; A. Snodgrass, fact. supt.

North Star Refrigerator Company, Chattanooga, Tenn.
Manufacturers of cabinets for household use.
G. C. Raoul, pres.; E. Y. Chapin, vice-pres.; H. C. Arnold, treas.; R. J. Frazier, sales and adv. mgr.; J. M. Alexander, pur. agt.; V. D. Rider, works mgr.

JARROW PRODUCTS TO MAKE GASKETS AND OTHER SPECIALTIES

Jarrow Products Corp., 143 W. Austin Avenue, Chicago, Ill., was organized during October, 1927, and is making refrigerator door gaskets. Other specialties will be added as the opportunity presents.

Considerable effort is being spent in research work and it is reported that they will soon have on the market gaskets that are new in design and materials.

Research testing under actual working conditions before the new product is placed in the hands of the manufacturer is under the direction of Mr. Harry W. Jarrow, who, for a number of years, has been identified with the development and manufacture of refrigerator door gaskets, and who brings to his company a thorough knowledge of their requirements.

REPORTS FINE GROWTH OF EXPORT BUSINESS

"Coincident with the development of our dealer and distributor organization in this country it is significant to note that during the last twelve months we have made a very fine start on what appears to be a substantial export business," says W. D. McElhinny, vice-president of Copeland Sales Co. "The rapidity with which the export business has developed has been surprising. In our own case we have shipped to approximately 25 foreign countries and have about that many foreign distributors, who in turn have numerous dealers operating under their jurisdiction. There is every indication that as time goes on, the export business in electric refrigeration will parallel that of the automobile and similar industries. During certain months of the year approximately 15% of our total production has been shipped outside of the borders of the United States."

Electric Refrigeration Directory (Cont'd)

Novoid (See Cork Import Co.).

Ohio Electric and Controller Co., 5900 Maurice Ave., Cleveland, Ohio.
Manufacturers of OHIO electric motors.
F. W. Jessop, pres.; A. D. Walter, vice-pres.; C. Whittier, secy. and treas.; P. H. Diver, sales mgr.

Ottenheimer Bros., Inc., Fallsway and Hillen Sts., Baltimore, Md.
Manufacturers of OREOLE cabinets for household and commercial electric refrigerators; illuminated and non-illuminated refrigerator display cases.
R. F. Ottenheimer, pres. and gen. mgr.; B. M. Ottenheimer, vice-pres.; S. M. Ottenheimer, secy.-treas.; L. M. Hess, sales mgr.; A. T. Golding, adv. and sales promotion mgr.; J. B. Ottenheimer, fact. mgr.

** PEERLESS **

Peerless Ice Machine Co., 515 W. 35th St., Chicago, Ill.
Manufacturers of automatic refrigerating machines, water cooling plants, water regulators, and pressure controls. Brine circulating and methyl chloride direct expansion refrigerating systems for apartment buildings.

** PENN SWITCH **

Penn Electric Switch Co., 306 Twelfth St., Des Moines, Iowa.
Manufacturers of thermostats and other control devices, high and low pressure safety switches, pressure-vacuum operated control switches, water regulators.

The Phoenix Ice Machine Company, 2711 Church Ave., Cleveland, Ohio.
Manufacturers of PHOENIX refrigerating machinery for commercial use.
A. Novotny, vice-pres.; H. H. Jeck, secy.; H. E. Bollinger, treas. and mgr.; R. H. Whipple, sales mgr.; G. Vance Rupp, chief engr.; Fred Mayer, fact. supt.

Plymetl (See Haskelite Mfg. Co.)

Plympton Refrigerator Company, Inc., Ellwood City, Pa.
Manufacturers of Plympton directed air flow refrigerating sections for freezer cases, top counter and small cooler installations in connection with any refrigerating unit.
T. A. Daley, pres.; H. B. Beighley, secy.-treas. and gen. mgr.; H. L. Semans, chief engr.

Polaraire Electric Frigerator Co., 1610 North St., Philadelphia, Pa.
Manufacturers of POLARAIRE household electric refrigerators, commercial machines, motors, tubing, condensers and expanders, pressure controls.
L. V. Gillian, pres.; F. N. Miner, vice-pres.; R. M. Cook, secy.-treas; Chas. J. H. Freeth, sales mgr.; Joseph Roman, service mgr.

Polaris Electric Refrigerator Co., 417 First St., Logansport, Ind.
Manufacturers of POLARIS electric refrigeration machines for household and commercial use; electric refrigeration equipment for ice cream and soda fountain use.
C. H. Canode, pres.; J. F. McManus, vice-pres.; C. W. Church, secy.; H. A. Kraut, treas.; John Dubrovin, chief engr.; W. J. Ball, asst. mgr.

Progress Refrigerator Co., branch of Louisville Tin & Stove Co., 621 W. Main St., Louisville, Ky.
Manufacturers of PROGRESS electric refrigerator cabinets.
W. L. Hollis, pres.; C. C. Cloud, vice-pres.; C. V. Edmonds, secy.-treas.

Pure Cork Products Company, Inc., Suite 600, Shubert Building, 250 South Broad Street, Philadelphia, Pa. Factories in Spain.
Manufacturers of pure sheet corkboard and cold temperature insulation accessories.
Leon Lewis, pres.; Morris Volsman, vice-pres.; William Miller, secy. and treas.; and H. T. Hellbrueck, gen. mgr.

Ranney Refrigerator Company, Greenville, Mich.
Manufacturers of cabinets for household and commercial use.
E. W. Ranney, pres.; L. W. Ranney, vice-pres. and secy.; H. N. Clement, treas.; S. C. Cutler, Chicago mgr.

Refrigeration Products Co., 670 E. Woodbridge St., Detroit, Mich.
Manufacturers of rotary compressors.
John C. Schott, pres.; Ray E. Davis, secy.-treas.

Reol Refrigerator Co., Hillen and Front Sts., Baltimore, Md. Subsidiary of Ottenheimer Bros.
Manufacturers of REOL cabinets for household and commercial electric refrigerators; illuminated refrigerator display cases.

** REX **

Rex Manufacturing Co., Western Ave., Connersville, Ind.
Manufacturers of REX household and commercial electric refrigerator cabinets.
Charles C. Hull, pres.; M. Lair Hull, vice-pres.; James M. Heron, secy.-treas.; Jos. T. McKinney, adv. mgr.; W. O. Hull, pur. agt.; M. R. Hull, fact. mgr.; Edgar Myers, sales mgr.

Cabinet Specifications

Model / Capacity	Width / Depth / Height	Finish Ext. / Int.	Insulation Walls / Bottom	Shp'g Wt.
100	26¼		Min. Wool	312 lbs.
7.8 sq. ft.	19⅛	Lacq.	2"	
4.4 cu. ft.	57½	En. or Porc.	2½"	
101	26¼		Min. Wool	305 lbs.
7.8 sq. ft.	19⅛	Lacq.	2"	
4.4 cu. ft.	52	En. or Porc.	2½"	
102	26½		Min. Wool	251 lbs.
7.8 sq. ft.	19⅛	Lacq.	2"	
4.4 cu. ft.	36¼	En. or Porc.	2"	
103	26¼		Min. Wool	315 lbs.
8.7 sq. ft.	22	Lacq.	2"	
5.1 cu. ft.	57½	En. or Porc.	2½"	
104	26¼		Min. Wool	308 lbs.
8.7 sq. ft.	22	Lacq.	2"	
5.1 cu. ft.	52	En. or Porc.	2½"	
105	26¼		Min. Wool	254 lbs.
8.7 sq. ft.	22	Lacq.	2"	
5.1 cu. ft.	36¼	En. or Porc.	2"	
400	37⅛		Cork	650 lbs.
16.1 sq. ft.	24	Lacq.	2"	
12.6 cu. ft.	65⅛	G. & P.	3"	
401	50⅝		Cork	760 lbs.
21.7 sq. ft.	26	Lacq.	2½"	
15.2 cu. ft.	70⅛	Porc.	3"	
205	31⅜		Cork	377 lbs.
9.2 sq. ft.	20	Lacq.	2"	
5.5 cu. ft.	57⅛	Porc.	3"	
305	31⅜		Cork	397 lbs.
9.2 sq. ft.	20	Porc.	2"	
5.5 cu. ft.	57⅛	Porc.	3"	
200	34⅞		Cork	441 lbs.
11 sq. ft.	22⅛	Lacq.	2"	
7 cu. ft.	62½	Porc.	3"	
300	34⅞		Cork	463 lbs.
11 sq. ft.	22⅛	Porc.	2"	
7 cu. ft.	62½	Porc.	3"	
201	34⅞		Cork	502 lbs.
12.5 sq. ft.	22⅛	Lacq.	2"	
9.2 cu. ft.	69½	Porc.	3"	
301	34⅜		Cork	524 lbs.
12.5 sq. ft.	22⅛	Porc.	2"	
9.2 cu. ft.	69½	Porc.	3"	
202	44⅜		Cork	615 lbs.
19 sq. ft.	22⅝	Lacq.	2½"	
12.2 cu. ft.	70	Porc.	3"	
302	44⅜		Cork	642 lbs.
19 sq. ft.	22⅝	Porc.	2½"	
12.2 cu. ft.	70	Porc.	3"	
203	52⅝		Cork	731 lbs.
24 sq. ft.	22⅞	Lacq.	2½"	
15.4 cu. ft.	70	Porc.	3"	
303	52⅝		Cork	763 lbs.
24 sq. ft.	22⅞	Porc.	2½"	
15.4 cu. ft.	70	Porc.	3"	

Models **100-105** inclusive can be had with cork insulation if desired.

** RHINELANDER **

Rhinelander Refrigerator Company, Rhinelander, Wis.
Manufacturers of AIRTITE cabinets for household and commercial electric refrigerators.
R. A. Riek, gen. mgr.

Cabinet Specifications

Model / Lbs. Ice / Doors	Width / Depth / Height	Finish Exterior / Interior	No. Shelves / Insulation / Shpg. Wgt.
77325*	55		10
300	24	Porc.	Corkb'd
6	66	Porc.	725 lbs.
G-12*	33		5
	24½	Lacq.	Corkb'd
4	67½	Porc.	430 lbs.
G-10	33		3
	24½	Lacq.	Corkb'd
2	60½	Porc.	405 lbs.
G-7	28¼		2
	21	Lacq.	Corkb'd
2	60	Enam.	300 lbs.
77319B*	45		4
	24	Porc.	Corkb'd
4	73½	Porc.	615 lbs.
77319*	45		4
200	24	Porc.	Corkb'd
4	54	Porc.	520 lbs.
7716*	34		4
100	21½	Porc.	Corkb'd
3	51	Porc.	350 lbs.
7715*	34		3
75	20	Porc.	Corkb'd
3	46	Porc.	305 lbs.
7714	34		3
50	18	Porc.	Corkb'd
3	43½	Porc.	275 lbs.
77317B*	35		4
	21½	Porc.	Corkb'd
4	72	Porc.	470 lbs.
77317*	35		4
	21½	Porc.	Corkb'd
4	53	Porc.	390 lbs.
1672*	23		1
	19½	Lacq.	Corkb'd
1	36	Enam.	160 lbs.
X-1*	28¼		2
	20	Lacq.	Corkb'd
1	59	Enam.	260 lbs.
G-1	26¼		2
	20	Lacq.	Corkb'd
1	56½	Enam.	240 lbs.

*Indicates that cabinet is designed for eectric refrigeration, being equipped with hanger bolts and capped opening for brine feed pipes.

Rice Products, Inc., 100 East 42nd St., New York City, and 315 Beaubien St., Detroit, Mich.
Rauf Manufacturing Co., Bogota, N. J. Manufacturers of ALPINICE domestic electric refrigerators.

Specifications

Trade name—ALPINICE; Refrigerant—sulphur dioxide; Compressor—model J-1 rotary; models S-1, S-2, S-3, S-4 reciprocating; Control—mercoid.

Self Contained Units

Model / Motor Capacity	Shelves / Ice Cubes	Width / Depth / Height	Const. Ext. / Int.	Insulation / Ship'g Wgt / Price
J-1	8 sq. ft.	28¾	Steel	Corkb'd
⅛ H. P.	4.3 lbs.	23	Lacq.	450 lbs.
5 cu. ft.	36	64	Enam.	$160 f.o.b.
S-1	10 sq. ft.	33¼	Steel	Corkb'd
¼ H. P.	5.6 lbs.	20¾	Lacq.	525 lbs.
7.5 cu. ft.	48	63	Enam.	$215 f.o.b.
S-2	10 sq. ft.	33¾	Steel	Corkb'd
¼ H. P.	5.6 lbs.	21	Lacq.	550 lbs.
7.5 cu. ft.	48	65	Porc.	$235 f.o.b.
S-3	13 sq. ft.	38½	Steel	Corkb'd
¼ H. P.	7 lbs.	23	Lacq.	600 lbs.
9 cu. ft.	60	71	Enam.	$248 f.o.b.
S-4	13 sq. ft.	38½	Steel	Corkb'd
¼ H. P.	7 lbs.	23	Lacq.	650 lbs.
9 cu. ft.	60	71	Porc.	$270 f.o.b.

Manufacturers of RICE household and commercial refrigerator units.
I. L. Rice, Jr., pres.; T. E. Carpenter, vice-pres. and gen. mgr.; Julian Rice, secy.; James H. Frazier, adv. mgr.; Frank R. West, chief engr.

The Roessler & Hasslacher Chemical Co., 709 Sixth Avenue, New York City. Factories at Niagara Falls, N. Y., Perth Amboy, N. J., and St. Albans, W. Va.
Manufacturers of Artic (Methyl Chloride) Ethyl Chloride; chemicals, minerals, oxides for ceramic purposes and electro-tinning chemicals.
W. A. Hamann, president; H. R. Carveth, first vice-pres.; P. Schleussner, second vice-pres. and secy.; Albert Frankel, treas.; Milton Kutz, mgr. of sales; T. Coyle, service engr.

** ROME **

Rome Manufacturing Co., Railroad St., Rome N. Y.
Manufacturers of ROME commercial electric refrigerating machinery.
P. C. Thomas, pres.; Barton Haselton, vice-pres.; E. L. Spriggs, vice-pres.; C. P. Drake, secy.-treas.; P. C. Thomas, gen. mgr.; C. P. Drake, sales mgr.; W. P. Davis, sales promotion and service mgr.; James Warren, works mgr.; C. A. Xardell, chief engr.

Specifications

Trade name—ROME; Refrigerant— ammonia Compressor—reciprocating; Control—thermostat.

Model	Motor	Capacity	Shpg. Wt.
100	2 H. P.	1 Ton	1400 lbs.
200	3 H. P.	2 Ton	1900 lbs.

** ROME-TURNEY **

The Rome-Turney Radiator Company, Rome, New York.
Manufacturers of HELICALFIN condenser tubes, refrigeration condensers, stampings of copper and brass, trays, grids, liquid receivers, brine tanks, etc.
W. L. Lynch, pres. and treas.; J. J. Boylan, secy.

The Russ Manufacturing Co., W. 58th and Walworth Ave., Cleveland, Ohio.
Manufacturers of BILT-RITE electrically refrigerated soda fountains, water coolers, and carbonators.
W. H. Ross, gen. mgr.; W. A. Schulte, gen. sales mgr.; M. E. Ewing, director of sales (department of liquid-cooling); H. C. Kellog, chief engr.

Sanitary Refrigerator Co., Oak Place, Fond du Lac, Wisc.
Manufacturers of SANITARY electric refrigerators for household use.

Savage Arms Corp., Turner St., Utica, N. Y.
Manufacturers of SAVAGE electric refrigerator equipment for ice cream and soda fountain use.
W. L. Wright, pres.; F. R. Phillips, vice-pres; J. H. Cook, secy.; E. A. MacDonald, treas.; F. F. Hickey, gen. mgr.; C. A. Baldwin, mgr. refrigerator division; R. B. Woolley, adv. mgr.; J. H. Cook, pur. agt.; F. T. Russell, works mgr.; W. L. Howlett, service mgr.; R. W. Ayres, chief engr. refrigeration department.

Specifications

Trade name—SAVAGE ice cream cabinets; Refrigerant—methyl chloride; Compressor—mercury, helix type; control—thermostat; Finish—exterior—all models black baked enamel, interior—all models hot galvanized and cadmium plated; insulation 3½" corkboard.

Model	Motor	Width	Depth	Hgt.	Net Wt.
2 hole	½ H. P.	29⅝	20¼	30	281 lbs.
3 hole	1/7 H. P.	40⅛	20¼	30	422 lbs.
4 hole	1/7 H. P.	52¼	20¼	30	563 lbs.
6 hole	¼ H. P.	74⅞	20¼	30	811 lbs.
4 hole	1/7 H. P.	35	29½	30	452 lbs.
6 hole	¼ H. P.	47⅛	29½	30	596 lbs.
8 hole	¼ H. P.	59¼	29½	30	691 lbs.
10 hole	¼ H. P.	72⅛	29½	30	787 lbs.

Convenient Service Record Card, Approved by Utilities, Offered by Electric Refrigeration News

.....Company

..... Unit

REFRIGERATION RECORD AND SERVICE DATA

Salesman.....Date of Sale.....

Consumer.....Address.....

Location Unit.....Serial No.....

Motor Mfgr.....Motor No.....

Type of Condenser.....Drive .....

Model.....Cooling Unit.....

Make Refrigerator.....Total Cu. Ft.....

Ice Compartment Width.....Depth.....Height.....

Condition.....In Use.....

Installed by.....Date.....

Meter Installed.....Date.....

How to Obtain Cards

Above is shown the "Refrigeration Record and Service Data" form developed by W. E. Clement, of New Orleans Public Service, Inc. The reverse side of the card is shown, in part, on the right. ELECTRIC REFRIGERATION NEWS has printed a supply of these cards (size 5 by 8 inches) and will furnish any quantity desired at $2.00 per hundred, parcel post prepaid.

SERVICE

Date	Trouble	Material Used	Time	Cost

Electric Refrigeration Directory (Cont'd)

The C. Schmidt Co., John and Livingston streets, Cincinnati, Ohio.
Builders and designers of refrigerators, cold storage, office and store fixtures.
J. H. Ahrens, pres.; H. C. Ahrens, first vice-pres.; A. E. Schmidt, second vice-pres.; E. J. Ahrens, secy.; J. A. Geiser, treas.

Fred Schmidgall & Son, 3089-91 Colerain Ave., Cincinnati, Ohio.
Manufacturers of ROYAL and AUTOMATIC refrigerator door fasteners.

** SEEGER **

Seeger Refrigerator Company, Arcade-Wells Sts., St. Paul, Minn.
Manufacturers of SEEGER refrigerator cabinets for household and commercial use.
John A. Seeger, pres.; Walter G. Seeger, vice-pres.; G. R. Seeger, secy.-treas.; John J. Leonard, sales mgr.; S. G. Greve, adv. mgr.; R. S. Ahrens, chief engr.; G. R. Seeger, works mgr.; T. LaVelle, supt.; Harry H. Webber, service mgr.; R. A. Calton, production mgr.

** SERVEL **

Servel Corporation, 51 East 2nd St., New York, N. Y. Subsidiary of the Servel Corp. (Delaware). Sales and advertising offices and factory at Evansville, Ind.
Manufacturers of SERVEL household electric refrigerators and electric refrigeration units for commercial ice cream and soda fountain use.
Frank E. Smith, pres.; W. F. Thatcher, vice-pres.; D. L. Adkins, secy.; F. O. Cummings, comptroller; H. W. Foulds, gen. sales mgr.; C. A. Miller, gen. service mgr.

Sherer-Gillett Co., 1701-09 S. Clark St., Chicago, Ill. Factories at Marshall, Mich.; Herkimer, N. Y., and Guelph, Ontario.
Manufacturers of freezer display and storage cases.
S. J. Sherer, pres.; R. P. Sherer, vice-pres.; Edw. Cohn, secy.-treas.; W. R. Featherstone, sales mgr.; W. T. Sherer, production mgr.

Socold Refrigerating Corp., 19 Stewart St., Lynn, Mass. Factories at Lynn and Walpole, Mass.
Manufacturers of SOCOLD household electric refrigerators, pumps and compressors.
Louis M. Atherton, pres.; Arthur F. Bent, vice-pres.; Charles H. Nevons, secy. and treas.; Roy H. Booth, sales and adv. mgr.; Clem M. Batchelder, pur. agt.; Arthur C. MacIntosh, chief engr.; Clifford E. Porter, service mgr.; Henry E. Ferris, works mgr.

Southern Soda Fountain Company, 12 East Lombard Street, Baltimore, Md.
Manufacturers of SOUTHERN electrically refrigerated soda fountains.
F. Leif Eareckson, pres. and treas.; C. C. Drain, secy.

The Stanley Knight Co., 218 West Superior Street, Chicago.
Manufacturers of electrically refrigerated soda fountains.
Stanley H. Knight, pres.; Leslie Arnett, sales mgr.

Steelprest (See Heintz Mfg. Co.).

Stow Mfg. Co., Inc., 443 State St., Binghamton, N. Y.
Manufacturers of motors for commercial electric refrigerator machines, grinders, flexible shafts and electric tools with metal working attachments for installation and repair work.
C. F. Hotchkiss, pres.; D. Walker Wear, vice-pres. and treas.; C. E. Hotchkiss, secy.; D. Walker Wear, gen. mgr.; Jas. P. Dickinson, fact. mgr.

Superior Iceless Refrigerator, Inc., Canton, O.
Manufacturers of SUPERIOR household, commercial, ice cream and soda fountain electric refrigerators, water coolers.
Chas. A. Kolp, pres.; Edward L. Frantz, executive vice-pres.; Frank A. Zink, treas.; H. B. MacAlpine, gen. sales director; George Lee Miller, works mgr.; J. E. Massey, production mgr.; C. J. Ossege, pur. agt.; Export Department—Superior Iceless Refrigerator, Inc., 149 Broadway, New York City, R. M. Sitterley, mgr.

Specifications
Trade name—**SUPERIOR**; Refrigerant—Sulphur dioxide; Compressor—reciprocating; **Belt** drive; Control—thermostat, bulb type, mercury switch.

Self Contained Units

Models Motor Capacity	Shelves Ice Cubes	Width Depth Height	Finish Ext. Int.	Insulation Ship'g Wgt. Price
SJR	8.7 sq.ft.	26¼		Min. Wool
⅛ H. P.	4½ lbs.	22	Lacq.	315 lbs.
5.1 cu. ft.	36	57½	Enam.	$175 f.o.b.
PSJR	8.7 sq. ft.	26½		Min. Wool
⅛ H. P.	4½ lbs.	22	Lacq.	320 lbs.
5.1 cu. ft.	36	57½	Porc.	$195 f.o.b.
P7S	11.39 sq. ft.	32⅜		Corkb'd
¼ H. P.	7½ lbs.	24½	Lacq.	441 lbs.
7 cu. ft.	54	61¾	Porc.	$341 f.o.b.
P9S	13.34 sq. ft.	32⅜		Corkb'd
¼ H. P.	10 lbs.	24½	Lacq.	502 lbs.
9 cu. ft.	72	69	Porc.	$378 f.o.b.
P12S	18.8 cu. ft.	42⅛		Corkb'd
¼ H. P.	10 lbs.	26	Lacq.	615 lbs.
12 cu. ft.	72	70⅛	Porc.	$400 f.o b
P15S	21.7 sq. ft.	50⅛		Corkb'd
¼ H. P.	12½ lbs.	26	Lacq.	731 lbs.
15 cu. ft.	90	70⅛	Porc.	$470 f.o.b.
SP7P	11 sq. ft.	40		Flax.
¼ H. P.	7½ lbs.	23½	Porc.	705 lb .
7 cu. ft.	54	67½	Porc.	$410 f.o.b.
SP9P	13.9 sq. ft.	43		Flax.
¼ H. P.	10 lbs.	23½	Porc.	760 lbs.
9 cu. ft.	72	74¼	Porc.	$485 f.o.b.
SP12P	18 sq. ft.	48½		Flax.
¼ H. P.	12½ lbs.	25½	Porc.	915 lbs.
12 cu. ft.	90	74¾	Porc.	$545 f.o.b.
P6P	8 sq. ft.	35¾		Corkb'd
¼ H. P.	5 lbs.	20⅛	Porc.	430 lbs.
5.8 cu. ft.	36	60½	Porc.	$325 f.o.b.
P7P	10.5 sq. ft.	38		Corkb'd
¼ H. P.	7½ lbs.	20¾	Porc.	480 lbs.
6.85	54	65¾	Porc.	$360 f.o.b.
P10P	14 sq. ft.	40¾		Corkb'd
¼ H. P.	10 lbs.	23	Porc.	540 lbs.
9.5 cu. ft.	72	65¾	Porc.	$400 f.o.b.

Surecold (See Warner Steel Products Co.).

C. J. Tagliabue Manufacturing Comany, 18 to 88 33rd St., Brooklyn, N. Y. Factories at Brooklyn, N. Y., and Cleveland, Ohio.
Manufacturers of SNAPON automatic controller for refrigerator thermostas; recording, dial, industrial, and laboratory types of thermometers; air-operated, self-operated, electric contact and other automatic controllers.
Cary D. Waters, pres.; Lawrence C. Irwin, vice-pres. and gen. mgr.; Miss E. C. Boetticher, secy.-treas.; Harvey D. Cooke, sales mgr.; Manoel F. Behar, adv. mgr. and sales promotion mgr.; Henry J. Nichols, pur. agt.; Victor Wichum, chief eng.; H. A. Birdsall, works mgr.; and Henry Hall, fact. mgr.

The Triumph Ice Machine Co., branch of The Triumph Electric Corp., 110 E. 70th St., Cincinnati, Ohio.
Manufacturers of TRIUMPH commercial, household, ice cream and soda fountain electric refrigerating machines, water coolers; motors for commercial machines; pumps and compressors; condensers and expanders; oil interceptors; ammonia condensers; receivers; brine coolers and ammonia fittings.
J. C. Hobart, pres.; E. W. Hobart, secy.; G. P. Hunt, treas.; J. C. Hobart, M. L. Block, pur. agt.; J. O. Schultz, gen. mgr.; J. O. Schultz, sales mgr.; chief eng.; J. L. McClure, works mgr.

United Wire and Supply Corporation, Auburn, R. I.
Manufacturers of return bends for condenser units, coiled tubing, and silver solder.

** UNIVERSAL COOLER **

Universal Cooler Corp., 18th and Howard Sts., Detroit, Mich.
Manufacturers of UNIVERSAL COOLER electric refrigeration units for household, commercial, ice cream and soda fountain uses.

Curtis G. Dunham, pres.; Ford Ballantyne, vice-pres.; G. M. Johnston, vice-pres. and gen. mgr.; Albert H. Meinke, secy.-treas.; H. R. Christensen, compt.; Patterson Farmer, con. engr.; Harry Thompson, chief engr.

United Cork Companies, Grant Ave., Lyndhurst, N. J.
Manufacturers of CRESCENT corkboard insulation.
Edward Bose, pres.; Edwin J. Ward, secy.; Peter Binzel, Jr., treas.; L. T. Sibley, sales promotion mgr.; Q. J. Schwarz, supt.

Valerius Corp., Jefferson, Wisc.
T. L. Valerius, pres.; N. J. Braun, vice-pres.; Manufacturers of ICE-O-MATIC soda fountain cabinets, luncheonettes and commissary refrigerators.
P. J. Hayes, secy.; O. Roessler, treas.; L. A. Forsyth, gen. sales mgr.; James Lloyd, ser. mgr.; K. P. Lewis, eastern sales mgr., 55 West 42nd St., New York City; Wm. Pietsch, Milwaukee sales mgr., 458 Jefferson St., Milwaukee, Wis.; W. F. Elevin, 1030 Post St., San Francisco, Calif.

** VIRGINIA SMELTING **

Virginia Smelting Co., West Norfolk, Va.
Manufacturers of chemical, extra dry ESOTOO sulphur dioxide (anhydrous).
W. E. C. Eustis, president; A. H. Eustis, vice-pres.; F. A. Eustis, secy.; C. W. Johnston, gen. mgr.

** WAGNER ELECTRIC **

Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.
Manufacturers of WAGNER motors for household and commercial electric refrigerators.
P. B. Postlethwaite, pres.; A. H. Timmerman, vice-pres.; G. L. Evans, vice-pres.; J. W. Westcott, secy.; V. W. Bergenthal, treas.; E. H. Cheney, sales mgr.; E. A. Forkner, small motor sales mgr.; J. B. Eby, pur. agt.; G. A. Waters, chief eng.; G. B. Evans, gen. supt.; J. H. Devor, service mgr.

** WARNER STEEL **

Warner Steel Products Co., Ottawa, Kan.
Manufacturers of SURECOLD household and commercial electric refrigerators, water coolers, display counters, compressor units, and cooling coils.
C. E. Warner, pres.; A. L. Kitselman, vice-pres.; E. L. Warner, secy. and gen. mgr.; W. H. Warner, treas.; G. E. Freeman, sales mgr.; J. W. Cookus, adv. mgr.; H. K. Pinkerton, chief of engineering; W. G. Judd, mgr. of production; W. R. Jones, Kansas City branch mgr.; C. C. Shubert, Pittsburgh branch mgr.; J. W. Turner, Pueblo branch mgr.

Specifications
Trade name—SURE COLD; Refrigerant—sulphur dioxide; Compressor—reciprocating; Control—thermostat and pressure.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Finish Ext. Int.	Insulation Shpg. Wt.
6	5.1 sq. ft.	23¼		Corkb'd.
1/6 H. P.	3 lbs.	20⅛	Lacq.	325 lbs.
4.1 cu. ft.	28	51	Enam.	
8	6.75 sq. ft.	25½		Corkb'd.
1/6 H. P.	6.5 lbs.	21¼	Lacq.	424 lbs.
4.6 cu. ft.	42	56⅛	Enam.	
10	7.16 sq. ft.	22½		Corkb'd.
¼ H. P.	9.5 lbs.	22¾	Lacq.	486 lbs.
5 cu. ft.	63	61	Enam.	
11-B	10.16 sq. ft.	29⅜		Corkb'd.
¼ H. P.	9.5 lbs.	23¾	Lacq.	572 lbs.
7.5 cu. ft.	63	63½	Enam.	
11-C	10.16 sq. ft.	29⅜		Corkb'd.
¼ H. P.	9.5 lbs.	23¾	Lacq.	572 lbs.
7.5 cu. ft.	63	63½	Porc.	
12-B	14 sq. ft.	38		Corkb'd.
¼ H. P.	12.5 lbs.	26¼	Lacq.	735 lbs.
10.5 cu. ft.	84	63½	Enam.	
12-C	14 sq. ft.	38		Corkb'd.
¼ H. P.	12.5 lbs.	26¼	Lacq.	735 lbs.
10.5 cu. ft	84	63½	Porc.	

Remote Installations

Model	Motor	Capacity	Ice	Cubes
7	1/5 H. P.	0.7 cu. ft.	2 lbs.	15
15	¼ H. P.	7-15 cu. ft.	8 lbs.	63
20	¼ H. P.	15-30 cu ft.	12 lbs.	84
25	⅓ H. P.	30-50 cu. ft.	18 lbs.	126
30	½ H. P.	50-95 cu. ft		

Commercial Compressors
All models 3 cylinders; air cooled; pressure control; sulphur dioxide.

Model	Motor	Capacity	Weight
32	½ H. P.	350 lbs.	425 lbs.
42	¾ H. P.	375 lbs.	450 lbs.
52	1 H. P.	500 lbs.	475 lbs.

** WAYNE **

Wayne Company, Fort Wayne, Indiana.
Manufacturers of electric refrigerators for household use.
Wm. M. Griffin, pres.; B. F. Geyer, gen. mgr.; E. A. Zern, treas.; C. G. Guild, secy.; A. D. Carriger, vice-pres. and director of sales; W. F. Brant, vice-pres. in charge of production; F. Andrews, refrigerator eng.; O. W. Barrett, pur. agt.; F. E. Mills, sales mgr.; L. A. Clark, asst. sales mgr. in charges of sales promotion; A. W. Clark, district mgr., Boston; C. F. Leland, district mgr., New York; R. A. Dempsey, district mgr., Philadelphia; G. A. Rodman, district mgr., San Francisco; H. A. Adams, district mgr., Chicago.

Specifications
Trade name—WAYNE; Refrigerant—Sulphur dioxide; Compressor—reciprocating; Control—thermostat.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Const. Ext. Int.	Insulation Net Wgt.
B5	10.5 sq. ft.	27	Steel	Corkb'd
⅛ H. P.	5 lbs.	26½	Lacq.	360 lbs.
5.5 cu. ft.	48	64	Enam.	
B5P	10.5 sq. ft.	27	Steel	Corkb'd
⅛ H. P.	5 lbs.	26½	Lacq.	360 lbs.
5.5 cu. ft.	48	64	Porc.	
B7	11.3 sq. ft.	27¾	Steel	Corkb'd
⅛ H. P.	10 lbs.	32½	Lacq.	460 lbs.
7 cu. ft.	96	61¾	Porc.	
B9	14.9 sq. ft.	27¾	Steel	Corkb'd
⅛ H. P.	10 lbs.	32½	Lacq.	550 lbs.
9 cu. ft.	96	69	Porc.	
B12	18.8 sq. ft.	42⅛	Steel	Corkb'd
¼ H. P.	10 lbs.	25⅝	Lacq.	625 lbs.
12.7 cu. ft.	96	70⅛	Porc.	
B15	21.7 sq. ft.	50⅝	Steel	Corkb'd
¼ H. P.	12.5 lbs.	28⅝	Lacq.	750 lbs.
21.7 cu. ft.	120	70⅛	Porc.	

Remote Installation

Model	Motor	Capacity	Ice	Cubes
A1S10	⅛ H. P.	10 cu. ft.	6.5 lbs.	63
A1S15	⅛ H. P.	15 cu. ft.	10 lbs.	96
A2S20	¼ H. P.	20 cu. ft.	12.5 lbs.	120
A2S30	¼ H. P.	30 cu. ft.	15 lbs.	144
A2S40	¼ H. P.	40 cu. ft.	17.5 lbs.	168
A1T10	⅛ H. P.	10 cu. ft.	4.3 lbs.	42
A1T15	⅛ H. P.	15 cu. ft.	10 lbs.	96
A2T20	¼ H. P.	20 cu. ft.	10 ls.b	96
A2T30	¼ H. P.	30 cu. ft.	15 lbs.	144

Western Automatic Machine Screw Co., Elyria, Ohio.
Manufacturers of screw machine products for use in the manufacture and assembly of electric refrigerators, standard cap and set screws, semi-finished nuts, studs and taper pins.
B. C. Franklin, vice-pres. and gen. mgr.; F. H. Bryant, secy.; C. H. Smith, treas.; R. D. Oldfield, sales mgr.; F. H. Bryant, pur. agt.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Manufacturers of motors for commercial machines.
C. D. Kester, Synchronous motor section, motor apparatus sales.

Whitehead Refrigeration Co., 3730 Woodward Ave., Detroit, Mich. Subsidiary of Whitehead & Kales Co.
Manufacturers of WHITEHEAD household refrigerator units.
T. C. Whitehead, pres.; H. V. Collins, sales mgr.; J. R. Weeks, H. Greenwald, engrs.; William J. Edmunds, service mgr.

** WELSBACH **

Welsbach Co., Gloucester, N. J. Subsidiary of United Gas Improvement Co.
Manufacturers of WELSBACH electric refrigeration units for household and commercial use; water coolers; chemicals; paint.
Sidney Mason, president; Townsend Stites, vice-pres.; E. L. Knoedler, vice-pres.; F. J. Rutledge, vice-pres.; Paul Thompson, vice-pres.; G. W. Curran, secy.; I. W. Morris, treas. and asst. secy.; E. MacMorris, asst. secy.; T. W. MacLary, asst. treas., refrigeration division; Howard R. Lukens, gen. mgr.; R. R. Thompson, sales mgr.; A. B. Hatch, mgr. public utility relations; C. B. Ryan, Jr., mgr., service and sales promotion; R. D. Lombard, commercial sales eng.; R. B. Havans, adv. mgr.; F. A. Wegener, chief eng; E. L. Knoedler, gen. supt.; Whitney Kirk, pur. agt.

Specifications
Trade name—WELSBACH; Refrigerant—Alcozol; Compressor—horizontal, double acting, reciprocating; Control—thermostat; V belt drive; Brine tank.

Self Contained Units

Model Motor Capacity	Shelves Ice Cubes	Width Depth Height	Const. Ext. Int.	Insulation Net Wgt. Price
101	8 sq. ft.	31	Wood	Corkb'd
¼ H. P.	7.5 lbs.	21½	Lacq.	492 lbs.
5.5 cu. ft.	72	64¼	Porc.	$375 Inst'd
201	10 sq. ft.	37	Wood	Corkb'd
¼ H. P.	11 lbs.	21½	Lacq.	546 lbs.
7.5 cu. ft.	108	62¾	Porc.	$450 Inst'd
260	8.1 sq. ft.	27¼	Steel	Corkb'd
¼ H. P.	6.5 lbs.	23⅜	Lacq.	442 lbs.
5.5 cu. ft.	63	57½	Porc.	$325 Inst'd
270	9.5 sq. ft.	32¾	Steel	Corkb'd
¼ H. P.	6.5 lbs.	23⅜	Lacq.	485 lbs.
7.1 cu. ft.	63	57½	Porc.	$350 Inst'd
280	11.8 sq. ft.	36	Steel	Corkb'd
¼ H. P.	8.5 lbs.	23⅜	Lacq.	511 lbs.
79 cu. ft.	84	57½	Porc.	$415 Inst'd

Remote Installations

Model	Motor	Capacity	Ice	Cubes	Price Inst'd
S108	— H.P.	8 cu.ft.	3 lbs.	30	$215
S208	¼ H.P.	8 cu.ft.	7.5 lbs.	72	260
S209	¼ H.P.	9 cu.ft.	7.5 lbs.	72	265
S210	¼ H.P.	10 cu.ft.	6.5 lbs.	63	250
S212	¼ H.P.	12 cu.ft.	8.5 lbs.	84	265
S214	¼ H.P.	14 cu.ft.	8.5 lbs.	84	275
S215	¼ H.P.	15 cu.ft.	11 lbs.	108	295
S216	¼ H.P.	16 cu.ft.	12.5 lbs.	126	295
S220	¼ H.P.	20 cu.ft.	12.5 lbs.	126	305
S225	¼ H.P.	25 cu.ft.	12.5 lbs.	126	315
S2530	¼ H.P.	30 cu.ft.	12.5 lbs.	126	325
S2540	¼ H.P.	40 cu.ft.	12.5 lbs.	126	335

** WILDER METAL **

Wilder Metal Company, Niles, Ohio.
Manufacturers of WILDER Metal Sheets for Brine Tanks, cooling units, inside linings, and refrigerator parts. Steel stampings processed with Wilder Metal.
John Wilder, pres.; P. C. DeVoe, vice-pres. and secy.

** WINTERS & CRAMPTON **

Winters & Crampton Manufacturing Co., Commerce Avenue and Goodrich Street, Grand Rapids, Mich.
Manufacturers of refrigerator hardware.
A. F. Winters, pres.; B. R. Crampton, vice-pres. and treas.; H. E. Bouwknegt, secy.; and R. A. Gilbert, works mgr.

** WIRFS AIRTITE **

E. J. Wirfs Organization, Inc., 135 S. 17th St., St. Louis, Mo.
Manufacturers of Wirfs AIRTITE cushion gasket.
E. J. Wirfs, Sr., pres.; A. H. Smith, vice-pres; E. J. Wirfs, Jr., secy.-treas.; A. H. Smith, director of sales; E. J. Wirfs, Jr., adv. mgr.; R. A. Tris, pur. agt.; Geo. H. Jaromack, fact. mgr.

Wolfe Engineering and Mfg. Co., 1408 Vernon St., Harrisburg, Pa.
Manufacturers of compressors and electric refrigeration equipment.
F. S. Wolfe, pres.

** WOLVERINE TUBE **

Wolverine Tube Co., 1411 Central Ave., Detroit, Mich.
Manufacturers of copper tubing, coils, and condensers.
Chas. C. Limbocker, pres.; Harry J. Hooks, secy. and treas.; G. R. Anthony, vice-pres.

** WOOD CONVERSION **

Wood Conversion Company, 360 North Michigan Avenue, Chicago; Mills at Cloquet, Minn.
Manufacturers of BALSAM-WOOL Insulation for refrigerator cabinets; also of half-inch insulating board.

Zero-Aire Corp., 510 N. Dearborn St., Chicago, Ill.
Manufacturers of ZERO-AIRE electric refrigeration units for household, commercial and ice cream and soda fountain use.
W. M. Tippet, pres.; P. G. Jacobson, vice-pres.; C. W. Johnson, secy.-treas.; C. W. Johnson, sales mgr.; J. H. Dennedy, chief engr.

Zero Vender Inc., 42 East Pearson St., Chicago, Ill.
Manufacturers of ZERO VENDER equipment for dispensing bottled beverages.
P. R. Finch, pres.; Karl K. Kenderdine, vice-pres.; R. H. Richter, sales mgr.

Zerozone (See Iron Mountain Co.)

A Popular Interpretation of the Social Side of Electric Refrigeration

Courtesy of the Chicago Tribune

Artificial Ice

By W. E. Hill

The girls, who inhabit de luxe apartment hotels (no cooking allowed) where, with every two rooms and bath, the management throws in an individual ice plant, are having no end of fun with the artificial ice Ladies with too much time on their hands and a tendency to undue introspection can go into the serving pantry and make the cutest little ice cubes for hours at a time. It's a grand way of keeping off the blues on dull afternoons

"My dear, you must come over and see our new artificial ice and electric stove combination with radio attachment that broadcasts as the ice freezes!" Social life in the suburbs has become awfully hectic since everybody who is anybody has gone in for plain and fancy electric ice plants. Time was when you could get a line on a family's social status by the make of their car, or the way they were interior decorated, but that was long ago. Nowadays you can tell instinctively whether the so and sos are worth knowing by the number of ice cubes per minute their ice box is capable of throwing off.

The ice substitute Archie is one of those delicate boys, nearly sneezing his poor little head off at the slightest provocation The little wife asked him to bring home a container of caramel ice cream in one of those dry packs, and he must have hugged it too closely to his manly breast Anyhow he's sneezing again.

"Haven't you ever played bridge before?" Not all the artificial ice is in the ice box. Twelve below zero is the look with which the bridge player fixes an unlucky partner who couldn't remember trump when it was "four no trumps doubled."

No artificial ice plant ever freezes as completely as does the Victorian lady when confronted by 1927 legs and knees and what have you in a public conveyance.

An over-the-kitchen guest room in a country household where one of those semi noiseless electric ice plants has been installed will be a lot more exciting for a week-end guest than sleeping over the morning coffee grinder On and off and off and on during the night said guest will wake from a troubled slumber thinking that maybe there's an earthquake or that maybe something is going to blow up

There's plenty of ice along Main street this morning, and it's not manufactured ice either Mrs. McMorgue and Mrs. Corpsey had a little difference of opinion not long ago, and now, when they pass by, ice forms on even the warmest days.

And right here we may as well warn those families who are putting in artificial ice as a kitchen convenience for the cook that a good old fashioned ice man has a sex appeal that somehow or other is lacking in a modern refrigerator. There has yet to be an artificial ice plant with "It."

New York City Adopts Amended Safety Code Affecting Refrigeration

Complete Text of Revised Ordinance Passed by Aldermen After Months of Discussion

THE revision of the New York city safety code governing the installation of refrigerating machinery, which has been under consideration for over two years, was finally accomplished with the passage of the amended ordinance which will take effect immediately. Various hearings held by the Welfare Committee of the Board of Alderman in which representatives of the New York City Fire Department, the American Society of Refrigerating Engineers, the Board of Fire Underwriters' the American Engineering Standards Committee, and representatives of leading manufacturers of equipment participated, have been reported in previous issues of ELECTRIC REFRIGERATION NEWS. The proposed ordinance, as it stood prior to the final amendments, was published in full in the issue of July 20, 1927. Following is the complete text of the adopted code as it appears in the New York City Record of Thursday, December 15, 1927:

No. 1303.

Report of the Committee on General Welfare in Favor of Adopting a Substitute Ordinance to Amend Chapter 10 of the Code of Ordinances, Relating to Explosives and Hazardous Trades.

The Committee on General Welfare, to which was referred on June 21, 1927 (Minutes, page 1164), the annexed ordinance to amend chapter 10 of the Code of Ordinances, relating to explosives and hazardous trades, respectfully

REPORTS:

That this proposed ordinance was submitted at the request of the Fire Commissioner; it is self explanatory.

Your Committee, after an extended hearing and on recommendations of the Fire Commissioner, which recommendations were concurred in by the representative of the Board of Fire Underwriters and representatives of manufacturers of refrigerating machines and the American Society of Refrigerating Engineers, has prepared the accompanying substitute ordinance, which it presents to the Board for adoption.

SUBSTITUTE

AN ORDINANCE to amend chapter 10 of the Code of Ordinances, relating to explosives and hazardous trades.

Be it Ordained, by the Board of Aldermen of The City of New York, as follows:

Section 1. The heading of chapter 10 of the Code of Ordinances is hereby amended to read as follows:

Chapter 10

***Explosives and Hazardous Trades**

[Regulations of the Municipal Explosives Commission]

Article
1. General provisions.
2. Certificates and permits.
3. Bonds and fees.
4. Manufacture, storage, sale, transportation and use of explosives.
5. Ammunition.
6. Fireworks.
7. Matches.
8. Mineral oils.
9. Inflammable mixtures.
10. Combustible mixtures.
11. Garages.
12. Motor vehicle repair shops.
13. Dry cleaning and dry dyeing establishments.

[†] 14. Motor cycle repair shops and storage places.

15. Paints, varnishes and lacquers.
16. Calcium carbide.
17. Gases under pressure.
18. Refrigerating [plants] systems.
19. Nitro-cellulose.
20. Inflammable motion picture films.
21. Distilled liquors and alcohols.
22. Oils and fats.
23. Technical establishments.
24. Wholesale drug stores and drug and chemical supply-houses.
25. Retail drug stores.
26. Miscellaneous.

Section 2. Section 1 of article 1 of chapter 10 of the Code of Ordinances, relating to definitions, is hereby amended by adding thereto a new subdivision 33 to read as follows:

33. Refrigerating system, a combination of apparatus in which a refrigerant is circulated for the purpose of extracting heat.

(a) The parts of the system are the compressor, generator, condensor, absorber, receiver, shell type or tube type apparatus, pipes, vessels, or other parts, containing refrigerant.

(b) Direct refrigeration, a system in which the refrigerant is circulated to the substance or space refrigerated.

(c) Indirect refrigeration, a system in which brine cooled by the refrigerant is circulated to the substance or space refrigerated.

(d) Refrigerant is the chemical agent other than brine used to produce refrigeration.

(e) Irritant refrigerant, any refrigerant which when breathed attacks the throat or lungs.

(f) Hydrocarbon refrigerants, any refrigerant of the hydrocarbon class.

(g) Flammable refrigerant, any refrigerant which will burn or explode when mixed with certain proportions of air.

(h) Refrigerating machinery room, a room in which is located a refrigerating system containing refrigerant, but not including expansion coils when located in cold storage rooms or expansion coils when located in refrigerator boxes.

(i) Factor of safety, the multiple three and one-third (3 1/3) the product of which and the test pressure, constitutes the probable rupture pressure.

(j) Pressure imposing element, that apparatus which draws the refrigerant from the low pressure or low temperature side of the system and discharges it into the high pressure or high temperature side of the system.

(k) Pressure limiting device a pressure or temperature responsive mechanism for automatically stopping the operation of the pressure imposing element.

(l) Brine, any liquid which having been cooled by the refrigerating system is used for the transmission of heat.

(m) Pressure relief device, a pressure relief valve, a rupture member, fusible plug or other approved device for relieving the pressure.

(n) Pressure relief valve, a valve held shut by a spring or other means to automatically relieve pressure in excess of its setting.

(o) Rupture member, a device that will automatically rupture at a pre determined pressure.

(p) Liquid receiver, a vessel permanently connected to a system by inlet and outlet pipes for storage of liquid refrigerant.

(q) Container, a cylinder for the shipment of refrigerant constructed to conform to the regulations of the Interstate Commerce Commission.

(r) Mixer, a vessel or device in a system for mixing the ammonia or other soluble vapor with water.

(s) Stop valve, a shut-off valve for use during normal operation.

(t) Service valve, a key-operated shut-off valve used only during shipment, installation or repairs.

(u) Fusible plug, a device having a predetermined-temperature fusible member for the relief of pressure.

(v) Public buildings, business buildings, and residence buildings are buildings as so defined by section 70, article 4, of the Building Code of the city of New York.

Section 3. Subdivision 35 of section 43 of article 3, chapter 10 of the Code of Ordinances is hereby amended to read as follows:

35. Refrigerating [plants] systems:
[capacity of 10 tons or less..$ 5.00 New
capacity of 10 tons to 50 tons $10.00 New
Capacity of over 50 tons....$20.00 New
Except as above provided, fees for permits shall be fixed by the fire commissioner.]
Class A systems.....$20.00
Class B systems.....$10.00
Class C systems.....$ 5.00

Section 4. Article 18 of chapter 10 of the Code of Ordinances is hereby repealed and a new article 18 substituted therefor, to read as follows:

Article 18
Refrigerating Systems

Section
216. Permits.
217. Supervision.
218. Classification.
219. Permissible locations.
220. Machinery rooms and ventilation.
221. Open flames and electrical equipment.
222. Testing.
223. Piping.
224. Safety devices.
225. Size of safety devices.
226. Location and discharge of safety devices.
227. Operating precautions.
228. Equipment diagrams.

§216. Permits.

(a) Except as hereinafter provided in this article it shall be unlawful to maintain or operate a refrigera ing system without a permit.

(b) A permit will not be required for a class C system when installed or used in a residence building or in a tenement house, or in the residence portion of a business building.

(c) No refrigerating system shall be maintained or operated employing a refrigerant other than those specified in this article without a permit issued upon such conditions, consistent with the provisions of this article, as are deemed by the fire commissioner necessary in the interest of public safety.

(d) A permit, where required, shall be applied for forty-eight hours after installation is completed, containing the name of the person for whom the system is installed and the place of location of the system.

(e) Only the refrigerant specified in the permit shall be used in the system.

(f) Refrigerating systems to which these provisions cannot be applied, may be maintained and operated subject to such conditions as are deemed necessary by the fire commissioner.

§217. Supervision.

(a) No refrigerating system containing more than fifty (50) pounds of refrigerant shall be maintained or operated in any building except under the personal supervision, direction or control of either a duly licensed engineer or a person who has obtained a certificate of qualification to operate such a system from the police department. Where the system contains not more than 200 pounds of refrigerant and is fully automatic only one qualified operator will be required.

(b) No class C system as hereinafter permitted for exhibition or demonstration purposes, shall be maintained or operated in a public building or exhibition hall except under the personal supervision direction or control of either a duly licensed engineer or a person who has obtained a certificate of qualification to operate such a system from the police department.

§218. Classifications.

(a) The total amount of refrigerant common to a system operating through one or more evaporators, shall be considered the capacity of the system and determine its class.

(b) A class A system is a system containing one thousand (1,000) pounds or over of refrigerant, or capable of thirty (30) tons capacity or over.

(c) A class B system is a system capable of less than thirty (30) tons capacity, or containing less than one thousand (1,000) pounds of refrigerant and over the amounts provided for in a Class C system.

(d) A class C system is a system containing not more than twenty (20) pounds of refrigerant.

§219. Permissible locations.

(a) No class A or class B systems shall be installed in any public building as defined by section 70, article 4, of the Building Code, until plans have been filed with and approved by the fire commissioner, and no refrigerant shall be placed in the system until a permit has been obtained from the fire commissioner.

(b) The direct method of refrigeration shall not be used in any building, whether or not a permit is required for installation therein, outside of the refrigerating machinery room except in buildings used exclusively for ice making or for refrigerating purposes or both; when not carried above the first floor in business buildings; in the business sections of business buildings provided the entire system is confined to one floor in the space occupied by a single tenant; in the business section of a residence building when not carried above the first floor; in a residence building occupied by not more than two families; or in any building provided a non-irritant and non-flammable refrigerant is used.

(c) No brine shall be used in any brine circulating system that will generate flammable vapor at a temperature below 100 degrees Fahrenheit when tested in a Tagliabue open cup tester, and no refrigerant shall be used as a brine.

(d) No class A system using ammonia shall be installed or maintained in any building above the first floor level unless such building is used exclusively for icemaking or refrigerating purposes.

(e) Systems on demonstration in exhibition halls shall be limited to the unit type containing not more than ten (10) pounds of refrigerant.

(f) No refrigerating system in which an irritant or a flammable refrigerant is used shall be installed or maintained in stairways or halls of any building, or in any building or parts of buildings used as a theatre, motion picture theatre, hospital, asylum, dance hall, court house, police station, jail, public rooms in a passenger depot, subway station, or school, unless the room or rooms containing the refrigerating system are cut off from the building or parts of the building by unpierced fireproof construction. This subdivision shall not apply to hermetically sealed unit systems containing not more than five pounds of refrigerant when located in dance halls, court houses, police stations, diet kitchens of hospitals, laboratories, and when located in rooms shut off from the rest of the building by tight partitions and tight fitting, self-closing doors.

(g) An intermittent absorption type of refrigerating machine shall not be permitted in a class A system. Such a type of machine shall not be permitted in a class B system only when a heating medium of low pressure steam is used in its operation.

(h) The use of methyl and ethyl chloride, sulphur dioxide or a hydrocarbon refrigerant will not be permitted in class A systems.

(i) A class B system using ethyl chloride or a hydro-carbon refrigerant shall not be installed or maintained in the borough of Manhattan or in other built up sections of the city. Elsewhere, it shall be installed or maintained only in a fireproof building of not more than one story in height, and shall be located on the ground floor, which shall be of unpierced fireproof construction. The refrigerating machinery room shall be cut off from the rest of the building by unpierced fireproof walls of not less than eight (8) inches of brick or six (6) inches of reinforced concrete. Direct exit therefrom leading to the open air and not to any other part of the building shall be maintained and shall be provided with vapor-tight, self-closing fireproof door or doors.

§220. Refrigerating machinery rooms and ventilation.

1. Refrigerating machinery rooms

(a) All refrigerating machinery rooms in which an irritant refrigerant is used shall be maintained vapor-tight except that all doors in refrigerating machinery rooms, in which an irritant refrigerant is used and which open to other parts of the building shall be self-closing and so close fitting as to prevent the passage of vapor and shall be kept closed at all times except during entrance or exit. All other openings that may permit the passage of vapor to other parts of the buildings shall be vapor-tight and kept clased. No openings from elevator shafts shall be permitted in the refrigerating

(*Continued on Page 26*)

Note—Matter in brackets [ ] is old matter, to be omitted.

*O.R., in foot notes, indicates original regulations of Municipal Explosives Commission.

[†Added to ordinance effective February 20, 1927.]

NEW YORK SAFETY CODE

(*Continued from Page 25*)

machinery room. This provision, however, shall not apply to dumbwaiter shafts the door openings of which are protected with self-closing fire doors.

(b) In class A and class B systems in which an irritant refrigerant is used, the doors of the refrigerating machinery rooms shall open outwardly.

2. Ventilation

(a) Each class A, B and C refrigerating machinery room of any system shall be independently provided with means for adequate ventilation to the outer air. The ventilation shall consist of a window or windows opening directly to the open air, or mechanical means capable of exhausting the foul air from the room.

(b) When a window or windows are used, if placed in opposite walls so as to provide a through air circulation to the outer air, a total area of inlet and outlet, respectively, of not less than that specified in column D of the table in paragraph (d) shall be provided. When a window or windows are placed in one wall a total area shall be provided not less than that specified in column E of the above mentioned table.

(c) When mechanical means are used they shall consist of a power driven exhaust fan of the enclosed cased blower type which shall be capable of removing from the refrigerating machinery room the amount of air specified in column B of the table in paragraph (d). The inlet to the fan shall be located near the refrigerating equipment. The outlet from the fan shall terminate not less than six (6) feet above the sidewalk and in no case under a stairway or fire escape. Where air ducts are used on either the inlet or discharge side of the fan they shall each have an area not less than that specified in column C of the above mentioned table. Sharp bends in the run of the ducts shall be avoided. The control for such mechanical means of ventilation shall be easily accessible and located outside of the refrigerating machinery room.

Pounds of Refrigerant in System	Mechanical Cu. Ft. per Minute Discharge	Mechanical Sq. Ft. Duct Area	Window Area in Sq. Ft. for Each Opposite Side	Window Area in Sq. Ft. for One Side Only
A	B	C	D	E
Up to 20	150	1-4	1	6
50	250	1-3	1 1-2	12
100	400	1-2	2	16
150	550	2-3	2 1-2	19
200	680	2-3	3	25
250	800	1	3 1-2	29
300	900	1	4	32
400	1,100	1 1-4	4 1-2	38
500	1,275	1 1-4	5	42
600	1,450	1 1-2	6	45
700	1,630	1 1-2	6 1-2	48
800	1,800	2	7	51
900	1,950	2	7 1-2	55
1,000	2,050	2	8	59
1,250	2,350	2 1-4	9	68
1,500	2,800	2 1-2	11	78
1,750	3,150	3	12 1-2	87
2,000	3,500	3 1-2	14	95
2,500	4,150	4	16	113
3,000	4,500	4 1-2	18	130
4,000	6,000	6	24	167
5,000	7,500	7 1-2	30	204
6,000	9,000	9	36	241
7,000	10,500	10.5	42	278
8,000	12,000	12	48	315
9,000	13,000	13	52	342
10,000	14,000	14	56	360
12,000	17,000	17	68	425
14,000	19,000	19	75	470
16,000	22,000	22	86	540
18,000	24,000	24	92	580
20,000	26,500	26	100	630
25,000	33,000	33	121	760
30,000	39,000	39	142	870
35,000	44,000	44	155	940
40,000	51,000	51	176	1,060
45,000	56,000	56	190	1,120

Note—Door openings, leading directly to the open air shall be considered equivalent to windows for the requirements specified in colums "D" and "E" of this table.

(e) Where a non-irritant or non-flammable refrigerant is employed, the requirements as given in table (d) may be reduced by one-half. When air or water is employed as the refrigerant no ventilation shall be required.

(f) In lieu of mechanical means of ventilation in refrigerating machinery room or rooms where a class A system, or a class B system using ammonia is installed, a water deluge may be provided which shall consist of a sprinkler system having open heads of not less than one quarter (¼) inch orifice spaced not more than eight feet apart in any direction, and such system shall be located above all the refrigerating apparatus and piping in the refrigerating machinery room. Not more than one head shall be installed on a ¾-inch pipe; five heads on a 1-inch pipe; six heads on a 1¼-inch pipe. The deluge system shall be permanently connected with the main house supply or other assured source from which a constant water pressure of not less than twenty pounds per square inch can be maintained on the inlet side of the main control valve or valves at all times. The control valve or valves for such water deluge system shall be manually operated, easily accessible and shall be labeled and located outside of the refrigerating machinery room.

§221. Open flames and electrical equipment.

1. Open flames

No fire, flame or arc light will be permitted in a class A or B refrigerating machinery room in which a flammable refrigerant is used.

2. Electrical equipment

(a) All class A and B systems shall have an emergency switch controlling all of the electrically operated refrigerating machinery or the remote control of such a switch located outside of the refrigerating machinery room where it can be quickly reached and operated in cases of necessity.

(b) Where the operating mechanism in any system is dependent upon electrical control, such control in a pressure limiting device shall be on a closed circuit.

§222. Testing

(a) Every part of any refrigerating system, except pressure gauges and control mechanism, shall be tested to at least the following pressures: Class A and B systems containing over fifty (50) pounds of refrigerant shall be tested after installation and proved tight before being operated. A dated declaration of such test, signed by the tester, shall be posted in the machinery room.

Refrigerant	Col. 1 High Pressure Side	Col. 2 Low Pressure Side With Safety Valves	Col. 3 Low Pressure Side Without Safety Valves
Carbon dioxide..	1,500	750	1,000
Ethane	1,050	520	760
Ammonia	300	150	225
Propane	250	115	175
Methyl chloride..	155	80	120
Sulphur dioxide..	105	55	75
Iso-butane	90	45	70
Butane	75	35	50
Ethyl chloride...	30	15	25
Dichloromethane.	12	12	12
Dichloroethylene.	12	12	12
Trichloroethylene	12	12	12

§223. Piping

1. Piping

(a) All piping, liquid receivers or vessels containing the refrigerant, shall be supported on or by strong and durable materials. This provision shall not apply to class C installations.

(b) The arrangement of stop valves, relief devices, etc., when used shall be as shown on the diagram for class A and B systems in section 228.

(c) Every system which may be charged after installation shall have the charging connection located on its low pressure side.

2. Gauge glasses

(a) Liquid level gauge glasses, except those of the bull's eye type, shall have automatic closing shut-off valves and such glasses shall be adequately protected against injury by slotted metal casings.

§224. Safety devices

1. Construction and Setting

(a) Pressure relief valves, pressure limiting devices and rupture members shall be set to prevent the pressure exceeding the test pressure. The pressure at which the device is set to function shall be indicated thereon. (See Section 222 (a), columns 1 and 2 of Table.)

(b) Fusible plugs shall relieve the pressure at a temperature not exceeding 280 degrees Fahrenheit.

2. Use of stop valves

(a) No stop valve shall be located between a pressure relief device or pressure limiting device and the part of the system protected thereby, unless two pressure relief devices of required size are used, and so arranged that only one pressure relief device can be cut off for repair purposes at any one time.

(b) A class B system on which no stop valves are used and in which the pressure will equalize throughout the system when the pressure imposing element is not in operation may be protected by only one pressure relief device located on the high pressure side.

3. Ammonia mixer

(a) The low pressure side of a class A ammonia system shall be provided with a hand operated valve for discharging the ammonia into water through a mixer to the sewer in case of emergency.

(b) The ammonia mixer shall be constructed of steel and shall be capable of withstanding a pressure of at least fifty (50) pounds per square inch.

(c) No valve shall be located in the ammonia emergency discharge line except the manually operated valve discharging into the water and ammonia mixer, but there may be one stop valve located inside the building for repair purpose only. This valve shall be sealed open and labeled "Keep Open."

(d) The manually operated pressure relief valve shall be located in a locked box which can be opened by members of the Fire Department by means of a Fire Department key. The door of the box shall be on the public thoroughfare side of the building in an easily accessible location and not less than eighteen (18) inches or more than five (5) feet above the sidewalk level. The box shall be permanently labelled having letters of not less than one (1) inche reading "For Fire Department Use Only." The relief valve shall be labelled "Ammonia." A sign shall be posted within the box reading "Do Not Open Valve Until Water is Flowing."

(e) A single standard three (3) inch fire department connection shall be provided through which the necessary water may be supplied to the mixer. The fire department connection shall be located near the box and not less than eighteen (18) inches or more than twenty-four (24) inches above the sidewalk level and shall be permanently labelled having letters not less than one (1) inch high reading "To Ammonia Mixer." A check valve so set as to prevent gases from reaching the fire department connection shall be installed in the water line between the fire department connection and the water and ammonia mixer.

(f) The fire department shall have sole use of the mixer and supply the necessary water.

(g) In systems using over twenty-seven thousand (27,000) pounds of ammonia there shall be provided one additional water and ammonia mixer for each twenty-seven thousand (27,000) pounds of ammonia or fraction thereof so used in excess.

(h) The ammonia mixer and its connections for a class A system shall conform to the diagram in section 228.

§225. Size of safety devices

(a) The size of pressure relief valves shall be as follows:

Capacity of System	CO/2 and Ethane, No. Req., Size	Other Refrigerants, No. Req., Size
	Inches	Inches
Up to 30 tons.....	1—½	1—½
30 to 60 tons.....	1—½	1—¾
60 to 100 tons.....	1—½	1—1
100 to 175 tons.....	1—½	1—1¼
175 to 250 tons.....	1—¾	1—1½
250 to 450 tons.....	1—1	1—2
450 to 900 tons.....	.....	2—2

(b) Where rupture members are permitted and used, the equivalent area of the relief valve specified must be provided.

(c) Fusible plugs may be used on all class C systems, and on all class B systems of the hermetically sealed compression type containing not more than fifty (50) pounds of refrigerant. The free discharge opening shall be one-sixteenth (1/16) inch in diameter.

§226. Location and discharge of safety devices

1. Location

(a) Every water cooled system containing more than twelve (12) pounds of refrigerant, the pressure imposing element of which is capable of producing a pressure in excess of the test pressure, shall be protected by a pressure limiting device.

(b) Each compressor or generator of a class A or B system shall be protected by a pressure relief valve connected into the high pressure side between the main stop-valve and the compressor or generator to relieve excessive pressure into the low pressure side of the system or to the atmosphere. The provisions of this subdivision shall not apply to class B systems of the hermetically sealed compression type, containing not more than fifty (50) pounds of refrigerant.

(c) A rupture member may be substituted for the relief valve in CO/2 systems or systems operating below atmospheric pressure.

(d) Shell type apparatus such as liquid receivers, condensers, evaporators, liquid separators and absorbers of class A and class B systems, which can be shut off by stop-valves shall each be equipped with a pressure relief valve, discharging as hereinafter provided.

(e) Class C systems so constructed that, when subjected to an abnormal outside temperature such as that generated in a fire, they may burst due to the expansion of the refrigerant, shall be protected by a pressure relief device.

2. Discharge of pressure relief valve

(a) Where ammonia is used in class A systems, the discharge from relief valves must be conducted to the outside atmosphere or into that part of the low pressure side protected by the mixer as specified in §224, 3. If it is discharged to the outside atmosphere it must be piped above the roof or not less than 12 feet above the grade. The discharge pipe shall be not less than the size of relief valve outlet. The discharge from more than one relief valve may be run into a common header, the area of which shall be equal to the area of the pipes connected thereto. The outlet orifice shall be turned downward.

(b) Where more than fifty (50) pounds of ammonia is used in a class B system the discharge from relief valves shall be pipes to the outside atmosphere as specified for class A systems or to the low pressure side as shown in diagram in section 228, or into a tank of water which shall be used for no purpose except ammonia discharge. At least one

(*Continued on Page 27*)

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(*Continued from Page 26*)

gallon of fresh water shall be provided for every pound of ammonia contained in the system. The water used shall be prevented from freezing without the use of salt or chemicals. The tank shall be substantially constructed of not less than one-eighth (⅛) of No. 11 U. S. gauge iron. No horizontal dimensions of the tank shall be greater than one-half (½) the height. T he tank shall have a hinged cover, or if of the enclosed type, shall have a vent hole at the top. All pipe connections shall be through the top of the tank only. The discharge pipe from the pressure relief valves shall discharge the ammonia in the center of the tank near the bottom. The tank shall be as securely supported as any other portion of the system. There shall be no opening in the tank below the water level.

(c) Where more than fifty (50) pounds of any refrigerant other than ammonia is used the discharge from relief valves shall be to the atmosphere as specified for class A ammonia systems. Carbon dioxide may be discharged into the room if same contains at least 10 cubic feet of capacity per pound of refrigerant used.

(d) Arrangements of pressure relief devices for class A and B systems shall conform to the diagrams in section 228.

§227. Operating precautions

1. Masks and helmets

(a) In a class A system which operates above atmospheric pressure shall be provided with at least two helmets or masks.

3. Storage of Refrigerant

(a) Refrigerant not contained in the refrigerating system shall be stored only in flammable or irrant containers conforming to the regulations prescribed by the Interstate Commerce Commission for the transportation of such refrigerant.

(b) Only two containers holding not more than a total of three hundred (300) pounds of flammable or irritant refrigerant shall be stored in the refrigerating machinery room of a class A system.

(c) Only one container holding not more than one hundred and fifty (150) pounds of flammable or irritant refrigerant shall be stored in the refrigerating machinery room of a class B system.

(d) In a class C system no refrigerant other than that used in the system shall be stored in the refrigerating machinery room.

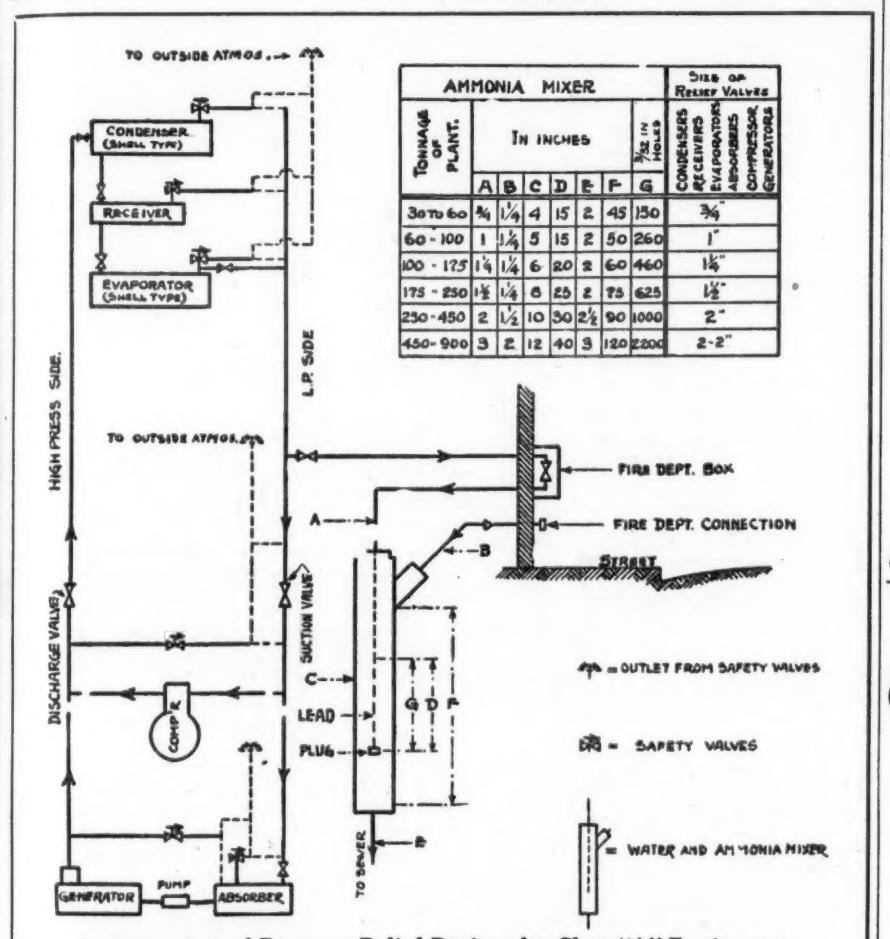
(e) If a greater amount of flammable or irritant refrigerant is desired other than that permitted in a refrigerating machinery room, it shall be stored in a fireproof building or enclosure used for no other purpose.

(f) When the refrigerant is withdrawn from a system it shall be discharged only into a suitable absorbent or containers conforming to the regulations of the Interstate Commerce Commission for the transportation of such refrigerant. No refrigerant shall be permitted to escape into the refrigerating machinery room.

(g) Containers shall not be connected to the system except during period of charging or withdrawing the refrigerant.

§228. Equipment diagrams

1. Arrangement of equipment for a class A system:



AMMONIA MIXER								SIZE OF RELIEF VALVES
TONNAGE OF PLANT.	IN INCHES						3/32 IN HOLES	CONDENSERS RECEIVERS EVAPORATORS ABSORBERS COMPRESSOR GENERATORS
	A	B	C	D	E	F	G	
30 TO 60	¾	1¼	4	15	2	45	150	¾"
60 - 100	1	1¼	5	15	2	50	260	1"
100 - 175	1¼	1¼	6	20	2	60	460	1¼"
175 - 250	1½	1¼	6	25	2	75	625	1½"
250-450	2	1½	10	30	2½	90	1000	2"
450-900	3	2	12	40	3	120	2200	2-2"

Arrangement of Pressure Relief Devices for Class "A" Equipment Section 228

(b) In a class B system in which more than fifty (50) pounds of ammonia, sulphur dioxide or other irritant refrigerant is used, there shall be provided at least one helmet or mask.

(c) Only helmets or masks that have been approved by the United States Bureau of Mines as suitable for the refrigerant employed shall be used, and they shall be kept in operative condition in an easily accessible case or cabinet located immediately outside the refrigerating machinery room.

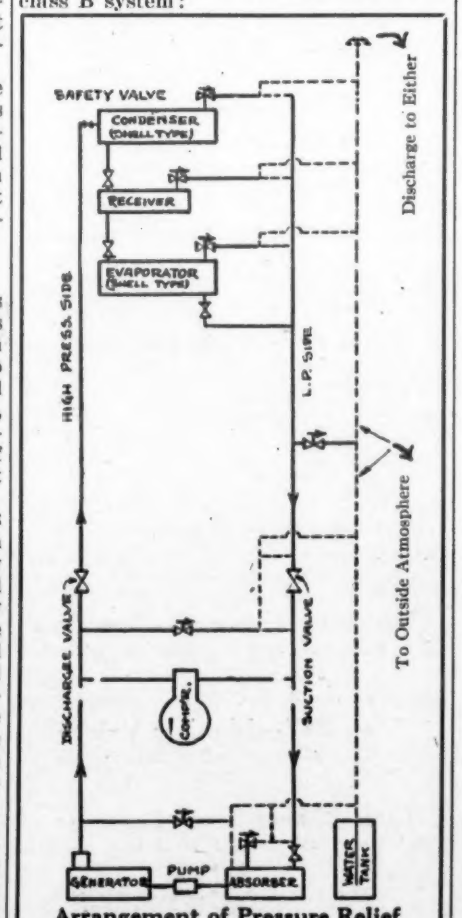
2. Signs

(a) On class A and class B systems containing more than fifty (50) pounds of refrigerant there shall be painted on and affixed in a permanent manner to the main steam control, main electrical and remote control switches, receivers, containers, shell type coolers, signs having letters not less than one and one-half (1½) inches high, designating the part and refrigerant contained therein.

(b) The seller of every class A or B system shall furnish the purchaser with a sign bearing his name at least 8½ by 11 inches in size, which gives the rated refrigeration capacity and the quantity and kind of refrigerant required for the satisfactory operation of the system and the purchaser shall conspicuously and permanently display this sign in the machinery room. The quantity and name of the proper refrigerant content and the rated refrigeration capacity shall be stamped on all class C systems near to or on the name-plate.

(c) The following information shall be posted in class A and B machinery rooms where over fifty (50) pounds of refrigerant is used: (a) The names and addresses of the engineers or operators in charge; (b) Location of nearest fire alarm box; (c) The name, address and telephone number of physician to be called in case of emergency; (d) Instructions for safely shutting down the plant in case of emergency.

2. Arrangement of equipment for a class B system:



Arrangement of Pressure Relief Devices for Class "B" Equipment Section 228

Section 5. This Ordinance shall take effect immediately.

FRANCIS D. McGAREY, MARTIN F. TANAHEY, GEO. W. FRIEL, STEPHEN A. RUDD, P. S. DOWD, WILLIAM P. SULLIVAN, FRANK J. DOTZLER, THOMAS J. COX, Committee on General Welfare.

(For text of the original of foregoing Ordinance see proceedings of June 21, 1927.)

Made General Order for the day.

The President pro tem. put the question whether the Board would agree with said report and adopt such Ordinance.

Which was decided in the affirmative by the following vote :

Affirmative—Aldermen Allen, Barrett, Burden, Campbell, Cashmore, Cassidy, Connolly. Corcoran, Cox, Cunningham, Curley, Dalton, Donovan, Dotzler, Dowd, Fenn, Friel, Graubard, Hagan, Hanley, Hannoch, Hart, Haslam, Henrich, Hilkemeier, Kaltenmeier, Keller, Kelly, Kiernan, Lenihan, McAuliffe, McCann McCusker, McGarey, McGillick, McGuinness, Mahon, Masterson, Molen Morris, Murtha, O'Reilly, Ott, Pratt, Reich, Rudd, Schwab, Shields, Smith, Stand, Sullivan (J. W.), Sullivan (T. J.), Sullivan (W. P.), Tanahey, Walsh, Weber, Williams, Wronker; President Byrne, by Peter A. Carey, Assistant Commissioner of Public Works; President Bruckner, by William J. Flynn, Commissioner of Public Works; President Connolly, by August Kupka, Assistant Commissioner of Public Works; President Lynch, by Robert A. Bailey, Assistant Commissioner of Public Works—62.

Davenport, Ia., Utility Man Addresses Lions Club

C. A. Nash, of the United Light & Power Co., Davenport, Iowa, addressed members of the Lions Club of that city on December 6, discussing the possibilities of electric refrigeration. Mr. Nash spoke of the advantages of electric refrigeration over ordinary methods and referred to the unusual future which apparently lies before the industry.

Refrigeration Patents

Classified List of New Inventions Recorded During 1927

NOTE: This list is complete to December 15, 1927. Patents issued during last half of the month will be published later. All refrigeration patents issued prior to January 1, 1927, appeared in a series of installments in Electric Refrigeration News issues of Mar. 2, 16 and 30, April 13, May 25, July 6 and 20, 1927

Class 20—Wooden Buildings

Sub Class 35—Door Construction
1,630,100, Walter H. Whittier.....May 24, 1927

Sub Class 92—Splices and Joints
1,644,910, Gerhard C. Bohn .....Oct. 11, 1927

Class 45—Furniture

Sub Class 71—Provision Safes
1,644,677, Sigmund F. Kohn.....Oct. 11, 1927

Sub Class 77—Guides
1,614,507, Benedict F. Vogt.....Jan. 18, 1927

Class 50—Fluid Pressure Regulators

Sub Class 26—Spring
1,618,815, Russell C. Cory et al....Feb. 22, 1927

Class 62—Refrigeration

Sub Class 3—Compressor-Condenser-Expander Circuit
1,646,919, Carl E. L. Lipman .....Oct. 25, 1927

Sub Class 4—Motor Control
1,613,241, John E. Mitchell .....Jan. 4, 1927
1,619,072, George Hilger .....Mar. 1, 1927
1,623,871, Arthur Green .....Apr. 5, 1927
1,630,077, Frank W. Schwinn.....May 24, 1927
1,631,345, Anthony T. Stock.....June 7, 1927
1,643,179, Albert F. Sawyer .....Sept. 20, 1927

Sub Class 5—Still Circuit
1,622,519, Frederick G. Keyes .....Mar. 29, 1927
1,622,520, Frederick G. Keyes .....Mar. 29, 1927
1,622,521, Frederick G. Keyes .....Mar. 29, 1927
1,622,522, Frederick G. Keyes .....Mar. 29, 1927
1,622,523, Frederick G. Keyes .....Mar. 29, 1927
1,627,808, Ralph E. Schurz .....May 10, 1927
1,645,017, Carl Munters and Carl Von Platen .....Oct. 11, 1927
1,646,607, Jens Orten Boving .....Oct. 25, 1927
1,646,712, Archie H. Strong.....Oct. 25, 1927

Sub Class 6—Expander
1,626,836, Pierre M. Jauvert.....May 3, 1927
1,642,015, Robert Cramer.....Sept. 13, 1927
1,651,112, Raoul Bernat .....Nov. 29, 1927

Sub Class 2—Automatic Control
1,645,,782, Frank Tyson .....Oct. 18, 1927

Sub Class 15—Ice Cars
1,632,370, Lawrence and Fred Cruncleton .....June 14, 1927

Sub Class 23—Cars, Ice Casing
1,646,241, Gustav J. Gruendler.....Oct. 18, 1927

Sub Class 24—Cars, Ice Box—Air-pump Circuit
1,643,471, Chester A. Richardson...Sept. 27, 1927

Sub Class 31—Ice Refrigerators
1,613,468, Harry J. McClafferty ....Jan. 4, 1927
1,624,678, Milton Schnaier .....Apr. 12, 1927
1,630,160, Benjamin W. Bayles ....May 24, 1927
1,637,494, Robert G. Marsch.....Aug. 2, 1927
1,645,103, Russell A. Gulick and H. H. Reed.....Oct. 11, 1927
1,651,741, Albert Tangenberg.....Dec. 6, 1927

Sub Class 34—Ice Refrigerators, Bottle
1,613,514, Morgan Howells .....Jan. 4, 1927
1,616,085, Milbourn W. Heath.....Feb. 1, 1927

Sub Class 37—Ice Refrigerators, Display
1,612,790, Joseph Acurso, Jr.....Jan. 4, 1927
1,622,920, Severin B. Nordskog ....Mar. 29, 1927
Re.15,595, John F. Barghausen ....Apr. 19, 1927
1,629,408, Albert Rogers Peacock...May 17, 1927
1,631,577, Clifford F. Boyer.....June 7, 1927
1,635,668, Gustav J. Gruendler .....July 12, 1927
1,639,841, Edward F. Deacon.....Aug. 23, 1927
1,643,372, Laurence E. Chambers...Sept. 27, 1927
1,647,785, Robert J. Coughlin.....Nov. 1, 1927

Sub Class 43—Ice Refrigerators, Flat Plate
1,618,514, Lloyd G. Copeman .....Feb. 22, 1927

Sub Class 46—Ice Refrigerators, Top Ice Box
1,613,721, Henry L. Roberts.....Jan. 11, 1927
1,617,552, Otto Strufe.....Feb. 15, 1927
1,618,469, Henry Parris .....Feb. 22, 1927
1,631,883, Jacob B. Ottenheimer....June 7, 1927

Sub Class 48—Ice Refrigerators, Door Operated Ice Box
1,619,741, Louis Lowy.....Mar. 1, 1927

Sub Class 51—Ice Refrigerators, Top Ice Box—End
1,622,766, Harry S. Cleveland .....Mar. 29, 1927
1,628,083, Benedict F. Vogt.....May 10, 1927

Sub Class 54—Ice Refrigerators, Top Ice Box—Drip Tube
1,639,528, Frederick Myer.....Aug. 16, 1927

Sub Class 57—Ice Refrigerators, Top Ice Box—Drip Casing
1,620,177, Markus Walint.....Mar. 8, 1927

Sub Class 64—Ice Refrigerators, Top Ice Box, Valved
1,622,478, Cecil O. Williams.....Mar. 29, 1927

Sub Class 69—Ice Refrigerators—Ice Tank
1,618,106, John Pickrell .....Feb. 15, 1927
1,633,231, Henry Schott .....June 21, 1927

Sub Class 75—Ice Refrigerators—Top Ice Box—Receptacle
1,621,322, Harold A. Hawn.....Mar. 15, 1927

Sub Class 83—Ice Refrigerators—Central Ice Box
1,639,591, Saverio Cozzolino.....Aug. 16, 1927

Sub Class 89—Refrigerators
1,630,065, Henry C. Leonard and Walter H. Whittier....May 24, 1927
1,633,225, Rudolph A. Riek.....June 21, 1927

Sub Class 92—Refrigerators—Liquefied Gas
1,615,562, Michael Zack .....Jan. 25, 1927
1,622,626, Julius G. Burns and H. S. Davis .....Mar. 29, 1927

Sub Class 95—Refrigerators—Indirectly Cooled
1,641,853, Rollin M. Hyde.....Sept. 6, 1927
1,625,878, Eugene L. Barnes.....Apr. 26, 1927
1,634,831, Fred J. Heideman.....July 5, 1927
1,646,186, Ralph Buit .....Oct. 18, 1927

Sub Class 101—Refrigerators, Surface Cooler, Liquid Surface
1,614,455, Alexander H. Cooke.....Jan. 18, 1927
1,640,252, Darl A. Rizer.....Aug. 23, 1927
1,641,980, Harry J. Mackey.....Sept. 13, 1927

Sub Class 104—Refrigerators, Liquid Contact Cooler
1,627,328, George Hilger.....May 3, 1927

Sub Class 105—Ice Making Apparatus
1,633,712, Max Ribi .....June 28, 1927

Sub Class 111—Ice Making Apparatus, Separator
1,647,116, Charles C. Spreen.....Oct. 25, 1927

Sub Class 114—Congelation Apparatus
1,624,679, Earnest J. Sweetland....Apr. 12, 1927
1,636,345, Russell A. Willson.....July 19, 1927

Sub Class 115—Compressor, Condenser, Expander Circuit
1,613,600, R. L. Alexander, W. Wishart and H. H. Waters..Jan. 11, 1927
1,612,963, George Bergdoll.....Jan. 4, 1927
1,617,631, Norman H. Gay.....Feb. 15, 1927
1,619,197, Ransom W. Davenport...Mar. 1, 1927
1,624,972, Thomas Irving Potter ...Apr. 19, 1927
1,635,058, Thomas I. Potter.....July 5, 1927
1,639,023, Willis H. Carrier.....Aug. 16, 1927
1,642,922, Lee B. Green.....Sept. 20, 1927
1,650,046, Walter G. E. Lolaf.....Nov. 22, 1927
1,621,161, Arthur Green .....Mar. 15, 1927
1,652,163, Willis H. Carrier.....Dec. 13, 1927

Sub Class 116—Compressor, Condenser, Expander, Refrigerator Type
1,619,195, Ransom W. Davenport...Mar. 1, 1927
1,619,548, Charles C. Spreen.....Mar. 1, 1927
1,632,283, Jonathan P. B. Fisk .....June 14, 1927
1,634,400, Ransom W. Davenport...July 5, 1927
1,634,813, Thomas C. Whitehead ...July 5, 1927
1,644,165, August Peter Anderson..Oct. 4, 1927

Sub Class 118—Still, Condenser, Expander Circuit
1,646,520, Gaudenz Bayer .....Oct. 25, 1927
1,649,973, Stuart Otto .....Nov. 22, 1927
1,649,974, Stuart Otto .....Nov. 22, 1927
1,650,230, William Newcomb .....Nov. 22, 1927
1,652,458, Alfred Richter.....Dec. 13, 1927

Sub Class 119—Still, Condenser, Expander Circuit, Absorber
1,620,843, B. C. Von Platen and Munters .....Mar. 15, 1927
1,615,353, Edmund Altenkirch.....Jan. 25, 1927
1,636,115, Von Platen and Munters. July 19, 1927
1,651,007, Von Platen and Munters. Nov. 29, 1927
1,645,706, Alvar Lenning .....Oct. 18, 1927
Re.16525, Edmund Altenkirch.....Jan. 11, 1927

Sub Class 126—Liquefaction and Expansion, Expanders
1,622,376, Ransom W. Davenport...Mar. 29, 1927
1,643,314, Edward T. Williams.....Oct. 11, 1927

Sub Class 136—Liquefaction and Expansion, Expansion Motor
1,651,826, Frederick B. MacLaren..Dec. 6, 1927

Sub Class 153—Liquid Coolers, Hydroscopic
1,649,931, Harry A. Steinmeyer....Nov. 22, 1927

Sub Class 170—Processes
1,619,196, Ransom W. Davenport...Mar. 1, 1927
1,651,198, Henry C. Folger.....Nov. 29, 1927

Sub Class 172—Processes, Ice Making
1,616,492, F. M. Gutierrez y Lado..Feb. 8, 1927
1,641,139, William S. Glennan.....Aug. 30, 1927

Sub Class 178—Processes, Cooling by Vaporization
1,634,129, Daniel J. Young .....June 28, 1927
1,642,942, William H. Carrier.....Sept. 20, 1927
1,642,942, William H. Carrier.....Sept. 20, 1927
1,647,208, Ivar Amundsen .....Nov. 1, 1927
1,642,321, John J. Batterman .....Sept. 13, 1927

Class 74—Machine Elements

Sub Class 14—Mechanical Movements
1,642,900, David Franklin Smith...Sept. 20, 1927

Sub Class 21—Gearing, Belt
1,648,178, Harry B. Hull .....Nov. 8, 1927

Class 98—Ventilation

Sub Class 36—Building, Protecting Air Current
1,649,290, Albert W. DeNeen .....Nov. 15, 1927

Class 103—Pumps

Sub Class 44—With Motor, Fluid Transmission
1,650,377, Leroy Nixon .....Nov. 22, 1927

Sub Class 52—With Motor, Reciprocating Motor, Common Piston
1,625,153, Thomas I. Potter.....Apr. 19, 1927

Sub Class 136—Expansion Chamber, Rotary, Movable Vane, Radial
1,651,336, Rolando Wissler .....Nov. 29, 1927

Sub Class 137—Expansion Chamber, Rotary, Movable Vane, Radial, Diametrically Operating
1,649,256, Amandus C. Roessler....Nov. 15, 1927

Sub Class 150—Expansion Chamber, Rotary, Diaphragm
1,615,299, Enea Bossi .....Jan. 25, 1927

Sub Class 161—Expansible Chamber, Reciprocating Piston, Multiple Cylinders
1,613,767, Wm. A. Pascoe and John Tatter .....Jan. 11, 1927

Sub Class 218—Elements, Supports
1,631,619, G. A. Buvinger and C. Warner .....June 7, 1927

Class 105—Railway Rolling Stock

Sub Class 355—Special Car Bodies, Freight
1,616,582, Robert J. Kuhl.....Feb. 8, 1927

Sub Class 377—Special Car Bodies, Removable Covers
1,613,830, George A. Hull .....Jan. 11, 1927
1,623,305, Matthew Carr .....Apr. 5, 1927

Sub Class 423—Linings
1,631,297, Lothar Von Darrowski...June 7, 1927

Class 106—Plastic Compositions

Sub Class 18—Heat Insulating
1,613,137, Wm. R. Seigle.....Jan. 4, 1927

Class 108—Roofs

Sub Class 5—Car
1,647,382, Wm. D. Thompson .....Nov. 1, 1927

Class 137—Water Distribution

Sub Class 21—Tanks
1,623,802, Theodore S. Morton.....Apr. 5, 1927
1,652,665, Chester A. Frick.....Dec. 13, 1927

Sub Class 104—Float Valves
1,615,406, John R. Replogle.....Jan. 25, 1927

Sub Class 139—Valve Actuation
1,616,130, George F. Knox.....Feb. 1, 1927
1,625,324, Matthew H. Loughridge .Apr. 19, 1927

Class 154—Laminated Fabric and Analogous Manufactures

Sub Class 44—Heat, Insulating Coverings
1,618,455, Harry B. Lindsay .....Feb. 22, 1927

Class 172—Electricity—Motive Power

Sub Class 279—Alternating Motors, Starters
1,626,182, John G. Campbell.....Apr. 26, 1927

Class 182—Sewerage

Sub Class 8—Traps, Refrigerators Types
1,613,908, August G. Sandman .....Jan. 11, 1927

Class 183—Gas Separation

Sub Class 23—Liquid Treatment, With Deflection, Heat Exchanging
1,614,647, E. A. Brooks.....Jan. 18, 1927

Class 184—Lubrication

Sub Class 6—Systems
1,652,966, Louis F. Wagener .....Dec. 13, 1927

Class 189—Metallic Building Structures

Sub Class 46—Doors
1,618,476, Rudolph A. Riek.....Feb. 22, 1927

Class 211—Supports, Racks

Sub Class 8—Article Locking, Combined Lock and Clamp
1,623,947, Chester A. Frick.....Apr. 5, 1927
1,631,091, Chester A. Frick.....May 31, 1927
1,638,181, Gilbert C. Bell.....Aug. 9, 1927

Sub Class 25—Special Article
1,614,319, Gustav Schmidt .....Jan. 11, 1927

Class 217—Wooden Receptacles

Sub Class 5—Boxes
1,616,441, T. M. Condit and G. W. Anderson .....Feb. 8, 1927
1,646,616, Jack Carl Jankus.....Oct. 25, 1927

Sub Class 7—Boxes, Compartment
1,644,981, Lloyd G. Copeman.....Oct. 11, 1927
1,644,982, Lloyd G. Copeman.....Oct. 11, 1927
1,644,983, Lloyd G. Copeman.....Oct. 11, 1927
1,644,984, Lloyd G. Copeman.....Oct. 11, 1927
1,644,985, Lloyd G. Copeman.....Oct. 11, 1927
1,644,986, Lloyd G. Copeman.....Oct. 11, 1927
1,644,987, Lloyd G. Copeman.....Oct. 11, 1927
1,644,988, Lloyd G. Copeman.....Oct. 11, 1927

Class 220—Metallic Receptacles

Sub Class 9—Spaced Wall or Jacket
1,615,628, Thacher Jenney and H. G. Miner .....Jan. 25, 1927
1,631,165, Alfred H. Smith and E. G. Miner.....June 7, 1927
1,650,791, Frank S. Gibson .....Nov. 29, 1927
1,651,629, Louis A. M. Phelan.....Dec. 6, 1927

Class 225—Dispensing Beverages

Sub Class 21—Soda Water Apparatus
1,648,594, Wm. A. Schatz .....Nov. 8, 1927

Sub Class 28—Soda Water Apparatus, Fountains
1,632,486, Paul Maiwurm .....June 14, 1927

Class 230—Gas Pumps and Fans

Sub Class 6—Regulators for Electric Motor
1,622,023, Wm. Burlingham and R. L. Lovell.....Mar. 22, 1927
1,628,944, F. E. Wright and R. M. Warner .....May 17, 1927

Sub Class 11—Regulators, Speed Control
1,626,621, George Middendorf.....May 3, 1927

Sub Class 13—Regulators, Starting and Stopping Devices
1,636,294, Albert Delas .....July 19, 1927

Sub Class 27—Regulators, by Regulating Pump, Pump Valve Control, Discharge Types
1,619,466, Chas. P. Eisenhauer.....Mar. 1, 1927

Sub Class 30—Regulators, by Regulating Pump, Pump Valve Control, Expansible Chamber Operated
1,615,824, Fred C. Bell.....Feb. 1, 1927
1,632,562, Walter G. E. Rolaff.....June 14, 1927
1,633,056, H. G. Wishart and Wm. Wishart .....June 21, 1927

Sub Class 31—Regulators, by Regulating Pump, Pump Valve Control, Expansible Chamber Operated, Pilot Valve
1,614,481, Joseph B. McMullen....Jan. 18, 1927
1,614,676, Arthur J. Kerscher .....Jan. 18, 1927

Sub Class 34—Combined Devices, Intertia Types
1,613,121, Frank Oppman .....Jan. 4, 1927

Sub Class 105—Fluid Displacement, Jet Pumps, Fall Tube
1,651,749, Jens Orten Boving .....Dec. 6, 1927

Sub Class 191—Expansible Chamber, Reciprocating Piston, Multiple Cylinders
1,651,670, John O. Carrey.....Dec. 6, 1927

Class 236—Railway—Surface Track

Sub Class 15—Track Curves
1,616,519, Wm. I. Twombley.....Feb. 8, 1927

Sub Class 99—Ties, Cross Section, Tubular, Rectangular, Non-metallic, Armored, Tube
1,636,874, Earl Engler Snader.....July 26, 1927

Class 251—Valves

Sub Class 50—Reciprocating, Disk or Plug, Screw Actuated, Packed
1,634,628, John R. Replogle.....July 5, 1927

Class 252—Substance Preparation

Sub Class 5—Cooling and Refrigerating Compositions
1,629,733, Von Platen and Munters. May 24, 1927
1,631,573, George Barsky .....June 7, 1927

Class 257—Heat Exchange

Sub Class 22—Chamber, Internal Tube
1,649,330, Henry Torrance.....Nov. 15, 1927

Sub Class 39—Condensers, Surface, Air, Air Pump
1,644,520, Thomas P. Hagerman....Oct. 4, 1927

Sub Class 192—Tank, Indirect Exchange
1,635,962, Chas. D. Ryder and Chas. R. Moores .....July 12, 1927

Sub Class 198—Tank, Internal Tube
1,617,650, John Remonte .....Feb. 15, 1927

Sub Class 229—Vertical Casing, Internal Tube, Vertical Coil
1,620,713, Fred C. Bell.....Mar. 15, 1927

Sub Class 262—Conduits
1,614,159, Arthur R. Smith .....Jan. 11, 1927

Class 268—Closures—Operators

Sub Class 72—Door, Swinging Horizontally, Starter
1,640,213, John F. O'Connor .....Aug. 23, 1927
1,648,305, Stacy B. Haseltine .....Nov. 8, 1927

Class 277—Multiple Valves

Sub Class 52—Independent, Motion Type, Multiway
1,651,235, Earl B. Terrill.....Nov. 29, 1927

Class 292—Closure Fasteners

Sub Class 128—Bolts, Hooked End, Spring Projected, Operating Means, Rigid
1,616,998, Alfred E. Titus.....Feb. 8, 1927

Sub Class 226—Bolts, Swinging, Operating Means, Spring Projected, Operating Means, Rigid
1,619,831, Adolph Rubin .....Mar. 8, 1927

Class 297—Thermostats and Humidostats

Sub Class 3—Thermostats, Expanding Fluid
1,617,487, Lee P. Hynes.....Feb. 15, 1927

Directory of Engineers

Membership Roll of the American Society of Refrigerating Engineers

A

Adams, T. A., Manhattan Refrigerating Co., 525 West St., New York, N. Y.
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B

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Belshaw, Charles F., 12396 Monica Ave., Detroit, Mich.
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Bloom, S. C., 841 Monadnock Bldg., Chicago, Ill.
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Bouchard, John, Jr., John Bouchard & Sons Co., Nashville, Tenn.
Boucher, J. A., Gifford-Wood Co., Hudson, N. Y.
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Browne, Milton W., 3103 Coleman Rd., Kansas City, Mo.
Bruns, Henry H., L. Mundet & Son, Inc., 1461 Eighth Ave., New York, N. Y.
Buehler, Leon, Jr., Frick Co., Waynesboro, Pa.
Buensod, A. C., 125 W. 12th St., New York, N. Y.
Bull, Charles S., 241 East D St., Colton, Cal.
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Burt, A., A. & T. Burt, Ltd., Dunedin, N. Z.
Burton, E. F., Purdue University, West Lafayette, Ind.
Busch, August A., Anheuser-Busch, Inc., St. Louis, Mo.

C

Calhound, Sterling W., 1044 Asbury Ave., Evanston, Ill.
Carlson, C. J., 72 W. Adams St., Chicago, Ill.
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Carpenter, Martin R., 72 West Washington St., Chicago, Ill.
Carpenter, T. E., Rice Products, Inc., 100 East 42nd St., New York, N. Y.
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Cook, F. L., 57 Westminster Rd., Brooklyn, N. Y.
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Cross, James T., P. O. Box 1231, Wellington, N. Z.
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Ellis, W. J., The Consumers Co., Atlanta, Ga.
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F

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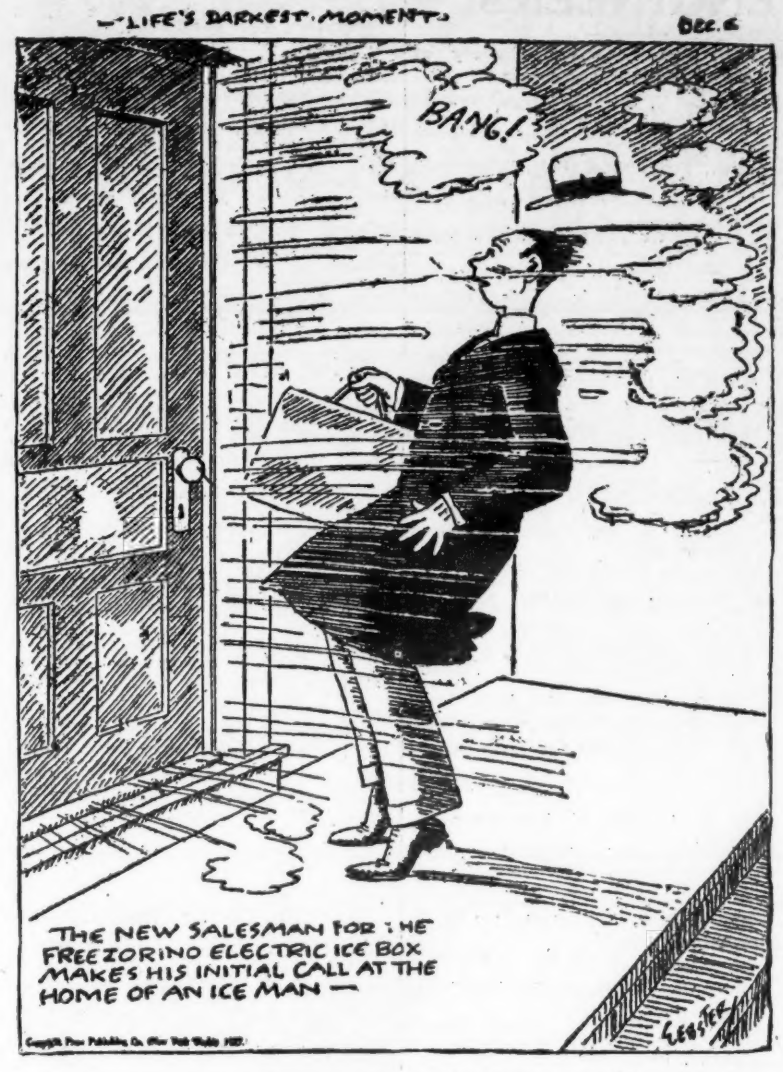
Frick, Ezra, 403 Clayton Ave., Waynesboro, Pa.
Friedl, Ralph, P. O. Box 695, Oakland, Cal.

(*Continued on Page 30*)

LIFE'S DARKEST MOMENT



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(*Continued from Page 29*)

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Fuller, F. M., De La Vernyn Co., New York, N. Y.

G

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"Engineering Comes Before Business"

The Role of the Technical Society in Industry

By David L. Fiske, Secretary, A.S.R.E.

Several elaborate research programs have been financed by the organization. There are a number of local organizations open to men in the several grades, in their own cities. It has an elaborate list of committees to set up standards, and collect information and cooperate with other societies. It is grouped in divisions with a chairman to grind the respective technical axes of each. The principal divisions deal with domestic refrigerating machinery, plant refrigerating machinery and refrigeration application. Membership is in four grades depending upon qualifications. Two of these, Member and Junior, are for engineers, the other two, Associate and Affiliate, for the non-technical.

Society Must Be Accepted by Industry

One statement is always in order from a secretary of an engineering society. No board of directors, nor paid office staff, however energetic, can force a progressive, cooperative professional body on an industry. If the society is not accepted in a personal sense, if responsibility is not assumed by men willing to get back what they put in *via* the good of the group, the thing will not go. Accordingly the engineering society is a very liberal organization with a large place in it for the individual, always receptive to new ideas, ready to take up any progressive work.

The American Society of Refrigerating Engineers has served as a clearing house for the refrigerating field for a quarter of a century and offers facilities for fostering the interests of the industry through its central office located with the headquarters of the main national societies. For either the engineer or the manager, concerned with the advance of this industry and his part of it, the A. S. R. E. offers a chance to be in the front line trenches of advance—in the real swing of things. Engineering comes before business!

One who professes engineering must face the rather chilling fact that technique is a means to an end—production—not the end in itself. He joins his engineering society with the same notion. It is true that the engineer is a tool of capital. He not only is, but he ought to be. Does this mean he becomes a cog in the works, and that the proceedings of his society are dull business where the interesting question of profits is ruled out of order? On the contrary, engineering fascinates and becomes professionally an end in itself, the work of his society becomes of impelling interest, and—more to the point, perhaps—the best engineer may become the best business man. Engineering technique, like the stock market, is always several jumps ahead of business. It is here that the true, long-pull, advance is made.

Efforts Combined in the Society

The history of the technical-professional societies bears out the fact that it is here that the industries have indeed grown up, that men guiding them have worked out their methods, solidified their efforts and made available in print a vast accumulation of experience. The society has served as a forum in which the rough spots of economic rivalry are rubbed off, difficulties settled and friendship cemented. As industrial cooperation grows so does the society. It is interesting to observe this growth and the growth of individual men, at once, in technical and commercial ability—men who look back upon these annals with so much satisfaction.

In its meetings the technical society is not limited to the dull precision of science. It will discuss anything; what the society insists is that what is taken up be considered impartially. The men who have developed in this work understand this keenly. Their number, these leaders, is not limited. Their technical progress and the progress of the industry are one.

Functions of the Society

The industry whose business it is to refrigerate has an accumulation of experience which is available for the future. The American Society of Refrigerating Engineers was started 25 years ago and has served its field as other established organizations have served theirs, with a present membership of about one thousand. It has two main functions, to hold meetings, and publish data from them or from committee investigations.

DIRECTORY OF ENGINEERS

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Stebbs, Leon B., General Refrigeration, 6607 Carnegie Ave., St. Louis, Mo.
Stencel, R. A., Canadian Ice Machine Co., Ltd., Toronto, Canada.
Sterrett, A. W., Seattle Ice Co., 2200 First Ave., South, Seattle, Wash.
Stevenson, A. R., Jr., General Electric Co., Power and Mining Engineering Dept., Schenectady, N. Y.
Stevenson, S. P., 1500 West Fourth St., Chester, Pa.
Stockham, J. W., 631 Interurban Bldg., Dallas, Tex.
Stockman, O. S., Armstrong Cork & Insulation Co., Union Bank Bldg., Pittsburgh, Pa.
Stone, Junius H., 1400 Broadway, New York, N. Y.
Stoner, Watson C., 241 South Potomac St., Waynesboro, Pa.
Stout, M. W., 5324 Euclid Ave., Kansas City, Mo.
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T

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Thompson, Edgar W., Thompson & Gidley, Ltd., 14 Hummum St., Fort, Bombay, India.
Thompson, Guy V., Knickerbocker Ice Co., 41 East 42nd St., New York, N. Y.
Thomson, A. Morris, 722 Clifton Ave., Newark, N. J.
Thurstensen, S., Henry Vogt Machine Co., Louisville, Ky.
Thurston, Edward D., Jr., Columbia University, New York, N. Y.
Thurston, Thomas G., National Engineer, 407 South Dearborn St., Chicago, Ill.
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Tohtz, H. W., 405 Franklin Ave., St. Louis, Mo.
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Truitt, Frank W., National Ice & Cold Storage Co., 22 Battery St., San Francisco, Cal.
Turner, Charles L., P. O. Box 5156, Philadelphia, Pa.

U

Uihlein, W. B., Joseph Schlitz Brewing Co., Milwaukee, Wis.
Uttley, Thomas V., Lancaster Ice Mfg. Co., Lancaster, Pa.

V

Vahlkamp, Charles G., City Consumers Co., Paducah, Ky.
Valentine, H. DeWitt, Central Hudson Gas & Electric Co., 50 Market St., Poughkeepsie, N. Y.
VanDeventer, H. R., 342 Madison Ave., New York, N. Y.
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Vilter, Emil, Vilter Mfg. Co., 872 Clinton St., Milwaukee, Wis.
Vogel, Albert O., 565 Lake Drive, Milwaukee, Wis.
Vogt, Clarence W., 34 Hill Top Road, Castlewood, Louisville, Ky.
Vogt, Henry, Henry Vogt Machine Co., Louisville, Ky.
Vollman, Carl W., Linde Canadian Refrigeration Co., 37 St. Peter St., Montreal, Can.
Von Weise, Louis B., 126 Chouteau Ave., St. Louis, Mo.
Voorhees, Gardner T., 870 Foxdale Ave., Winnetka, Ill.
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W

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Wallis, George E., Wenham, Mass.
Walton, Fred H., The Foundation Co., 120 Liberty St., New York, N. Y.
Ward, Edwin J., 1151 Eddy St., Chicago, Ill.
Warren, Alfred J., Pacific Fruit Express Co., 65 Market St., San Francisco, Cal.
Waterfill, Robert W., Carrier Engineering Corp., 750 Frelinghuysen Ave., Newark, N. J.
Watson, J. R., Ideal Electric & Mfg. Co., 407 South Dearborn St., Chicago, Ill.
Watts, Mahlon Bingaman, Y. M. C. A., Waynesboro, Pa.
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Weinberg, M. B., Frick Co., Witherspoon Bldg., Philadelphia, Pa.
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Weiss, T., 1420 Majestic Bldg., Milwaukee, Wis.
Wells, George E., Security Bldg., St. Louis, Mo.
Welscher, Benjamin A., Poplar Bluff Ice & Fuel Co., Poplar Bluff, Mo.
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Westerlin, J. M., 1113 Cornelia Ave., Chicago, Ill.
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Wheeler, John J., 93 Sixth Ave., Brooklyn, N. Y.
Whelen, S. J., Arctic Ice Machine Co., 2310 Jefferson Ave., South Norwood, O.
Whitaker, Charles L., Frick Co., Waynesboro, Pa.
White, Arthur C., Dow Chemical Co., Midland, Mich.
White, John A., P. O. Box 71, Trinidad, Colo.
Whitney, W. O., McIntosh & Seymour Corp., Auburn, N. Y.
Whittemore, Clinton L., Herf & Frerichs Chemical Co., 1011 Planters Bldg., St. Louis, Mo.
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Williams, Arthur E., Vilter Manufacturing Co., 872 Clinton St., Milwaukee, Wis.
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Williams, E. T., Servel Corp., 51 East 42nd St., New York, N. Y.
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Z

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